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Editorial

The life is short, the work is long, is true. Hippocrates' dictum was never more true than now. It is often said that medical standards elsewhere are declining. I think it true, perhaps it is due to the vast stretches of scientific knowledge which a doctor must now acquire, perhaps to the failure of medical education at undergraduate and postgraduate level. It may be the education, while comprehensive on the scientific side, is lacking in regard to adequate understanding of the humanist. But the most important qualities for a good doctor—compassion and common sense—cannot be taught by any academic programme.

Nevertheless, medical standards in the Royal Navy have risen to a remarkable extent during the past twenty years, and to maintain them and raised to new ones them, further continuing postgraduate education is essential. The speed with which knowledge expands in all branches of medicine and particularly in therapeutics poses problems for all doctors. Medical Officers serving in ships do not find establishments where contact with their colleagues is difficult or impossible, even a special problem.

Medical journals play an important role in postgraduate education, reporting on research, new work, teaching trends and discussing them. For the Service this journal must play its part. It should aim to provide reviews on subjects important to medical practice over a wide field in addition to reporting new work, clinical case material and news of the Service.

The Journal is therefore publishing a

series of review articles on the use and abuse of a variety of therapeutic substances—both one which is general and already or newly released. It is as important for medical officers to understand when drugs should be withheld as for them to know the indications for use and it is hoped that these articles will be of help to medical officers in their routine patient care. A review of the place of steroids in ophthalmology provides an opportunity for a detailed survey of the benefits such treatment may confer but more important indicates the considerable dangers of their use in situations where temporary or permanent harm may follow. Steroids must also be used with care in dermatology but have proved their value in many common problems that present day by day in the sick bay. An article in this issue discusses their use and abuse in the treatment of skin disease.

New drugs now undergo a long period of evaluation by the Committee on Safety of Medicines before they become generally available and medical officers are rightly cautious in their use when first they are released. Major breakthroughs in therapy have however occurred from time to time since the last war. Streptomycin in tuberculosis, Contraceptives Beta blockers and now Histamine H_2 Receptor Antagonists. An evaluation of the use of these which has recently received considerable publicity is also included in this issue of the Journal.

It is hoped that readers will make further suggestions for articles within the category which they would find particularly helpful in their practice.

Choice of Implants for Reconstruction of the Shot-Out Joint

J. Edwards & J. H. Rank

We wish to add our support to the observation by Shors (1990) that implant developments have now reached a stage where they can address the need for replacement of limbs or joint parts in which joints have been damaged by explosive weapons. In recent years, this problem has been highlighted by the extensive technique of 'knee capping' practised by terrorists in Northern Ireland.

What we want should be to ensure the joint to meet several functions: one requirement for new treatments must be tempered by uncertainties as the length of time an implant can be expected to provide good service. The majority of knee-implants were designed for the less active, older age group and the fully constrained hinge design described by Shors has been well known for becoming loose when fitted into young, energetic people. Since the injured young soldier will no doubt wish to return to a vigorous life as soon as possible, the procedure outlined by Shors would have greater clinical significance if one knew the time which has elapsed since operation and the present condition of the patient. It is also important to know the period of time between injury and operation, and the history of infection during this period.

Choice of Knee Implant

In practice, injuries sustained by an act of war or terrorism, or by an industrial accident involving an explosive or firing particles will almost certainly cover the full range of possibilities from localized

generation of joint articulation surfaces to massive mutilation of the limb. For the treatment of wounds lying between these two extremes a considerable number of knee implant designs are now available on the commercial market, each with their own advantages and disadvantages. In order to achieve optimum results for each patient, the implant should be carefully selected to match the particular injury.

While this is stated, it seems that we may classify knee joint injuries from explosive weapons into three major groups according to the condition of the ligaments and the amount of bone which remains capable of carrying load.

- (1) Ligaments in good condition with localized penetration of articular surfaces.
- (2) Good ligamentous recovery with partial destruction of bone ends.
- (3) Condition of ligaments insufficient for joint stability and/or massive destruction of bone ends.

Stability is a major factor when making the choice of prosthesis for each group.

GROUP 1 The first group is concerned with injuries which might arise from a relatively close penetration by a low velocity bullet or some other projectile. In the first instance this type of injury should be treated conservatively. Natural repair processes should be encouraged and one should wait for the symptoms of arthritis to develop. If surgery becomes necessary the patient can be treated as a conventional case of traumatic osteoarthritis. Provided that the ligaments are in good condition the

complete range of existing implants can be considered, including the small ear joint prostheses of Gossard (1971), Freeman (1973) and Dence (1973). For the older, less active patients in whom only one side of the joint is damaged one might even consider using the hemiarthroplasty prostheses of Platt & Pegler (1965), MacIntosh (1966) and Mikossov. In young, very active patients, however, we would recommend the Sheehan (1971 and 1974) or Armstrong (1974) prostheses because of their better load-bearing capacity.

GROUP 2. The second group is concerned with frequent straining postural destruction of the condyle with the result that they can no longer provide suitable fixation for small superficial implants but that good functional recovery of joint ligaments is expected. For these cases the prosthesis should have a stem in order to take advantage of arthrodesis fixation. The first large design described by Shiers would satisfy this requirement but where possible we would recommend use of the Sheehan prosthesis (1974) (Fig. 1) because it has demonstrated low tendency to become loose. This has been achieved by providing gliding motion during flexion and extension, together with some axial rotation and lateral mobility as in the mechanism of the normal knee, thereby reducing the magnitude of forces transmitted at the cement-bone interface. Damage to the condyle ligaments is of little consequence because arthrodesis fixation involves their removal. Furthermore, the design does have some inherent stability. However, it was designed to allow normal function of the collateral ligaments and thus prevents their contribution to knee stability. At present, therefore, it is not advisable to use the Sheehan prosthesis unless the collateral ligaments are in good condition.

GROUP 3. Our last group includes the ones described by Shiers where the expanded ends of the bones have been



Fig. 1. Type three joint prosthesis as designed by Sheehan (1974). P.A.S. (dependent) by condyle of J. M. Bostrom.

completely destroyed so that only the distal remains available for fixation of a prosthesis. This automatically implies the adoption of an arthrodesis fixation. The Sheehan prosthesis is unsuitable because its fixation requires bony support from the condyle and its dimensions are insufficient.

to fill the resulting gap between the bone ends (Fig 2). In addition, extensive bone damage will probably be accompanied by considerable distortion of ligamentous structures so that the implant must have an excellent fit in stability. It must also be able to withstand a large part of the load transmitted across the joint. At the present time, these requirements can only be satisfied by the fully constrained hinge devices of Blum (1966), Waldron (1966) and Sennett (1973). The possibility that these may become looser when put into service, where patients has to be weighed against the disadvantages of amputation.

Elbow Replacement

Injuries of the elbow sustained by an act of war or terrorism can be classified according to the same three groups as those of the knee. The case described by Meunier

would then fall under group 2 (i.e. partial condylar destruction). Since the ligaments of the elbow are less important for stability than those of the knee, the requirements of joint replacement would seem to be simpler. Unfortunately, however, elbow reconstruction has received less attention and therefore implant design for this joint involves more uncertainties.

The requirements of groups 1 and 2 would seem to be best satisfied by an unconstrained hinge device. However, although several are in process of development (Dow, 1975; Sreenivasulu, 1974; Hastings, 1976), including one from our own department (Gibson, 1976), only minimal hinge elbow designs are at present available on the commercial market (Dow, 1975; Moore, 1961 and 1976). For cases in group 2 the One problem offers the advantage of less elbow flexion/extension.

Custom-Made Prostheses

Joint damage due to injury frequently gives rise to situations where off the shelf prostheses do not satisfy the needs of an individual patient. Even the Meunier knee will only cope with a limited gap between the ends of the bone shafts and in many cases all that is required is a matter of copying implant dimensions. Advances in biomedical engineering during the last 10 years have provided the knowledge as well as the engineering personnel capable of solving this problem. It would be necessary to set up an engineering facility within the hospital for the design and manufacture of prostheses but this is merely a matter of administration and financing. One medical engineering post-graduate plus a workshop technician with appropriate machine tools would be able to satisfy 90% of the problems which arise.

When particular centres are frequently presented with joint injuries caused by accidents or explosive weapons we would strongly recommend that they consider setting up a medical engineering facility for



Fig 2. Damage to the knee, requiring a total knee prosthesis. (Seen in a patient with the One problem, the revision of J. B. Meunier.)

on manufacturers of custom made prostheses

Comment by Mr. L. G. P. Shaw

References

- ATENWADLER C. G. (1976) Results of the Royal College of Surgeons (London) 1964-65.
- BLAIR G. (1975) A new design of knee joint design. *The Royal Free Hospital and University College Hospital, University Medical Association* 104-107.
- COLE R. (1975) Personal communication. Apparently a preliminary study of knee prostheses.
- COLE R. (1975) Total replacement arthroplasty of the knee for chronic arthritis. *Journal of Bone & Joint Surgery* 14B, 19-21.
- EDWARDS J. B. (1974) MR. Thesis. University of Leeds. Unpublished.
- FARRMAN AND EDWARDS (1976) In Total Knee Replacement. Institute Orthopaedic, England. Volume 1, 100.
- LAWSON J. B. (1975) Polyethylene knee arthroplasty. *Journal of Bone & Joint Surgery* 14B, 22-23.
- MARTINSON (1976) Personal communication. Results of knee replacement in presence of development of the Charnley technique. Royal Free Hospital, England.
- MCCLELLAN E. L. (1976) Arthroplasty of the knee. *Journal of Bone & Joint Surgery* 14B, 17-19.
- MCCLELLAN E. L. (1976) Knee prostheses. In 1976-1.
- PLATT G. A. and PERLIN J. (1976) Knee arthroplasty of the knee. *Journal of Bone and Joint Surgery* 14B, 16.
- STEWART J. B. (1976) Arthroplasty of the knee. MR. Thesis. University of Leeds. Unpublished.
- STEWART J. B. (1975) The knee joint. *Proceedings of the Association of Surgeons* 10, 1-10. The knee joint of the Association of Surgeons.
- SHAW L. G. P. (1976) Knee arthroplasty for chronic osteoarthritis. 11-12.
- SHAW L. G. P. (1976) Knee arthroplasty of the knee. *Journal of Bone & Joint Surgery* 14B, 18.
- SHAW L. G. P. (1976) Arthroplasty of the knee joint. *Journal of the Royal Medical Society of London* 44, 175-177.
- STEWART J. B. (1976) Arthroplasty of the knee joint. In the First Annual Symposium on Arthroplasty. April 1976, London. The Charnley Foundation. South London. 1-10.
- STEWART J. B. and STEVENSON T. A. B. (1976) A report of arthroplasty of the knee joint. *Journal of Bone & Joint Surgery* 14B, 117-119.
- WILLIAMS J. (1976) Arthroplasty of the knee joint in osteoarthritis. *Journal of Bone and Joint Surgery* 14B, 17.

The names of two clinicians supplying the prostheses have been omitted (1976 supplied each year).

Thank you for inviting me to comment on the detailed and informative paper of Dr. J. Edwards and Professor J. B. Zarck. These papers represent a valuable summary of the present trends in total knee replacement, but there are one or two points which need attention.

In the second paragraph of these papers they state quite properly that satisfaction for new treatments must be tempered by uncertainties as to the length of time an implant can be expected to provide good service. In the particular two cases described in my paper there was no uncertainty. The first patient either had to lose his leg or have the only prosthesis out of the many available which could restore his function (none) and if one were to ask such a patient whether he would rather have his leg off or have an implant which might last as long as 10 or 15 or 20 years, there is little doubt as to what the answer would be. The second patient had a completely stiff elbow and following the operation he had an elbow with an excellent range of movement.

I have now carried out 200 total replacement of knee and 12 total replacement of elbow in the last 20 years and should a prosthesis become (and once we have been using cement very few of them did) one can always replace it in exactly the same way as a dentist replaces a loose filling in a tooth. There are of us who have been concerned in implant surgery know that current trends to expect all implants to be long surgery for example perhaps the best known prosthesis of which Charnley has been awarded one of those of McKee, Charnley, King and Muller. Every surgeon with experience in this surgery has had one or other of these implants loose, but nevertheless there are tens of thousands of people walking about now with perfectly painless and mobile hip joints thanks to these particular prostheses. No man who has a tooth crowned by a dental expert is

guaranteed as to how long the crown will last and if it comes loose the dentist can always replace it. I have replaced these prostheses when they became loose following accident and it is perfectly easy to remove the prosthesis or cement and reinsert.

A second point that should be made. I feel it that there are now so many varieties of knee prostheses that the orthopaedic surgeon coming new to the field is completely bewildered as to which one he should use. At the International Conference on Total Knee Replacement held in London in September 1976 I learned with

astonishment that there were over 100 different types of prostheses available. In 1954 when the Journal of Bone and Joint Surgery published my first paper on a preliminary report of a new method of knee replacement it was the only one!

Finally, whilst I fully agree it would be an excellent idea that all centres who are faced with frequent joint injuries should have a medical engineering facility to manufacture custom made prostheses — it must, in the present day where entire wings of hospitals are being closed down for lack of money, remain only an excellent idea.

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The Use and Abuse of Histamine H_2 -Receptor Antagonists

G. J. Miller-Thompson

ABSTRACT

The development of a new group of drugs has put the histamine H_2 receptors involved in the stimulation of gastric acid secretion in focus. The substances for this use in gastric ulcer therapy reflect considerable cross-fertilization between and the biological sciences and medicine. It is noted that the gastric H_2 receptor is a peripheral, it is likely that these drugs will prove effective in the treatment of other conditions.

Introduction

The problem of gastric ulcers is with us still. The physician's therapeutic endeavors have been restricted to food restriction and anticholinergics; the patient has been relieved of his symptoms only at the expense of long periods off work and eventually loss of his home. The phrase has named his condition.

A new drug is now available which may revolutionize our therapeutic approach to gastric ulcer. This compound antagonizes gastric acid secretion and thus may accelerate the healing of duodenal and gastric ulcers.

Development

For some time it has been known that gastric acid secretion, although stimulated by histamine, could not be inhibited by antihistamines such as mepyramine. The pharmacologists' receptors involved in histamine responses blocked by mepyramine were defined in 1946 as H_1 receptors by Ales and Schild and since that time pharmacologists have looked for drugs that will block the H_2 receptor and inhibit gastric acid secretion.

In 1972 Black and his colleagues published the results of their investigations

over a number of years into such compounds and described the first of these drugs to be tested in normal human volunteers, burimamide (Black, Duncan, Durant, Girdle and Parsons, 1973). When given intravenously to subjects whose gastric acid secretion was maximally stimulated by intravenous pyrilamine or histamine, secretion was inhibited by more than 50 per cent. Burimamide however was poorly absorbed from the gut and had to be given intravenously for maximum effect (Wyllie, Howells and Black, 1972).

In contrast, metiamide was a more potent H_2 -receptor blocker and was well absorbed from the upper small intestine. During 1974 its clinical pharmacology was extensively investigated and a small number of therapeutic trials were completed, but reports of bone marrow toxicity caused suspension of the Clinical Trials authorities and its use has been severely restricted since that time. There is good evidence that this toxicity was due to the thiazine moiety present in the side chain of metiamide rather than to histamine H_2 receptor blockade as cimetidine, which followed metiamide in 1975, has no such group. Cimetidine resembles metiamide in its antiserotony activity and pharmacological properties although it is slightly more potent (Black, Duncan, Durant, Girdle, Howells, Girdle and Parsons, 1974).

Absorption and Excretion

Cimetidine is rapidly absorbed from the small intestine. Administration of the drug with food delays absorption and the

adverse effect on blood concentrations at a time when the buffering capacity of the acid is waning through gastric emptying (Pounder, Williams, Kessel, Milton Thompson and Mansour, 1977c).

The drug is secreted in the urine and in the 24 hours following administration most (56-62%) of the dose is secreted unchanged, while 15% appears as the sulphoxide (Sheldon, Dawson, Bradford, Mills, Shaper, Riggs and Wylie, 1975).

Toxicology

Studies in animals have shown toxic effects only when the drug has been given at very high doses over a long period of time. A few patients have had skin rashes and diarrhoea, but no haematological abnormalities have been detected. In a small number of patients serum potassium concentrations have been found low but this was not progressive and there was no evidence of impairment of renal function. Three patients in remission who showed rises in transaminase concentrations had liver biopsies showing no abnormalities. A small number of male patients have noticed breast discomfort after long periods of treatment but there has been no evidence of hormonal change. The drug appears to have few unwanted effects but it must be remembered that as with all new compounds every practitioner must be ready to report possible adverse reactions to the Committee on Safety of Medicines on the yellow cards provided for this purpose.

In November 1976 cimetidine was listed by the Committee on Safety of Medicines and marketed in the United Kingdom as 'Tagamet'. Because it is now generally available it is appropriate to consider the use and possible abuse of this very interesting new drug.

Duodenal Ulcer

A number of studies have shown that histamine H_2 -receptor blockade inhibits

basal and secretin stimulated acid secretion and food stimulated secretion in patients with duodenal ulcer. Studying intragastric acidity over a 24 hour period we were able to show that 200 mg of cimetidine given after meals provided the greatest decrease of acidity that can be expected without recourse to much higher doses and that this reduction was very similar to that in patients who had undergone successful truncal vagotomy (Pounder, Williams, Milton Thompson and Mansour, 1975). Despite nocturnal pain as a frequent and distressing symptom of duodenal ulcer and because it seems likely that this is related to the high basal output of gastric acid during the night in this condition, it was felt that a larger dose for relief was probably necessary to control nocturnal acidity. Our results suggested that patients with duodenal ulcer should not take too much time before morning and take a large dose of cimetidine (400 mg) at bedtime in order to produce a maximal decrease of nocturnal gastric acidity. We have also shown that the combination of cimetidine with an anticholinergic or doses which can be obtained by patients appears to offer no advantage over treatment with the H_2 receptor antagonist alone (Pounder, Hoyt, Vincent, Milton Thompson and Mansour, 1977).

Several endoscopically controlled double blind clinical trials of cimetidine in duodenal ulcer have now been published (Mansour and Wylie, 1976; Gray, Macdonald, Smith, Burns, Chan and Colquhoun, 1975; Macdonald, Murray, Ford and Lawrence and Northfield, 1976). All have shown a significant advantage for the treated group over that receiving placebo. Overall experience to date suggests that a healing rate of seven duodenal ulcer in the region of 70 per cent can be expected in patients treated with cimetidine over a period of six weeks at a cost 25 per cent treated with placebo. Relief of symptoms

occurred earlier and was more complete in the treated group.

The problem of maintenance therapy in duodenal ulcer disease is less clear. Maintenance therapy using a single nightly dose of metimazole 400 mg was compared with placebo in a 1 year double blind trial but this was interrupted when metimazole was shown to be toxic. Analysis of the available data in terms of symptoms compared with relapse in patent weeks revealed a significantly greater remission in the metimazole group (P<0.050) (Thompson and Worsfold 1976). There is clearly a need for further studies in the field of maintenance therapy.

Gastric Ulcer

In the management of benign gastric ulcer a trial comparing metimazole against placebo has already shown a significant advantage for the treated group (Mallory et al, 1977). A preliminary report of a double blind trial of metimazole against cimetidine in benign gastric ulcer suggests that cimetidine may be more effective with a lower incidence of unwanted effects (Hunt, Pounder, Vincent, Cohen, Jones, Milson-Thompson and Manswick, 1977).

In the management of gastric ulcer however the possibility of malignancy must always be remembered. Our early experience with metimazole included the uncontrolled open treatment of eleven consecutive gastric ulcers, ten of which healed at the end of six weeks treatment. The eleventh patient with an apparently benign gastric ulcer was studied on metimazole but the histopathological and cytological appearances suggested malignancy. No symptoms persisted and at a repeat endoscopy after two weeks of treatment the ulcer was still present and the pathological appearances unchanged. Examination of the specimen removed at partial gastrectomy one week later showed

intestinalized carcinoma with ulceration (Pounder, Hunt, Whitehead, Milson-Thompson and Manswick 1976).

Every effort should therefore be made to establish the benign nature of a gastric ulcer before embarking on cimetidine treatment but a caveat be mentioned that even when multiple biopsies and cytological brushings are negative the lesion may yet ultimately prove to be malignant. The failure of a gastric ulcer to heal under medical treatment should alert the clinician to the possibility of histologic undiagnosed gastric cancer. Indeed, early metastatic cancer may at first heal under treatment with cimetidine with subsequent return of ulceration and pain (Pounder and Manswick 1976).

Zollinger-Ellison Syndrome

The rare syndrome of gastric hypersecretion secondary to abnormally high levels of circulating gastrin, either from a gastrin producing tumour or from hyperplasia of the gastric G cells, results in severe and persistent gastric ulceration, diarrhoea and loss of fluid and electrolytes. Treatment with H₂ receptor blockade may produce a dramatic amelioration of symptoms (Richardson and Fordham 1975; Holman, Smith and Baynes 1975; Booth, Carter, Mignot, Arroyo and Korman 1976) but the improvement is not always maintained. Cimetidine is certainly of value in this syndrome in enabling the patient to be studied in for surgery. When surgery is contraindicated H₂ receptor blockade should be considered as a long term measure. Further experience however will be necessary before the indications for the use of cimetidine in the Zollinger-Ellison syndrome can be clearly defined.

Acute Gastric Intestinal Bleeding

Woodward, Steele and Harrison (1976) treated fourteen episodes of gastric or

duodenal bleeding in eleven patients suffering from acute stress ulceration. In eleven instances, bleeding was due to gastric gastritis or duodenitis and bleeding promptly ceased after one or two doses of metacaine 300 mg at six hourly intervals, nor did it recur as long as the drug was continued. In the two instances in which bleeding persisted, chronic ulcers had eroded into major blood vessels. We have confirmed this experience in six cases using metacaine. Bailey, MacDonald and Williams (1976) have shown that metacaine or cimetidine are effective in the prophylaxis and control of acute gastric-arterial haemorrhage in liver failure. There is a promising future for the use of these drugs in the life threatening situation although the underlying mechanisms involved are not clearly understood.

Rifex Cimetidine

There is at present no satisfactory evidence as to the therapeutic value of cimetidine in the management of reflux oesophagitis. It has been shown that lower oesophageal sphincter pressure is hardly reduced and not altered by an infusion of metacaine (Miles Thompson and Mowden, 1974) or cimetidine (Dobson, Lennox, Henderson, Ljungqvist and Carter, 1974). These observations, together with the inhibition of gastric and duodenal tone to be produced by H_2 -receptor blockade suggest that cimetidine will prove a useful therapeutic agent in reflux oesophagitis but controlled trials are needed.

Cimetidine — Use and Abuse

Cimetidine is an expensive drug and its indications are not yet clearly defined. It may be life saving in treating acute gastric-arterial haemorrhage from acute gastritis or duodenal erosion and in controlling a patient with Zollinger-Ellison syndrome in for definitive surgery. It

promotes earlier healing of duodenal ulcers, relieves symptoms rapidly and allows patients to be treated in the outpatient department with the prospect of an early return to work. The high cost of treatment must be set against the rapid improvement in the patient's health without the necessity for bedrest and the economic benefits of resumed work, which will be enormous.

It may be that cimetidine will prove the most effective drug in the treatment of gastric ulcer particularly when endoscopy is contraindicated because of its side effects.

It is clear that H_2 -receptor antagonists should not be prescribed indiscriminately for dyspepsia. There are numerous causes for abdominal pain and discomfort which are quite unrelated to gastric and duodenal acid and it would be unreasonable to suppose that cimetidine will be of any value in these conditions. Every effort should therefore be made to establish a diagnosis either by barium studies, endoscopy or both before the drug is initiated. The practitioner should be clear in his own mind what he is treating and having embarked on a course of H_2 -receptor blockade should continue it for an adequate period of time (five to six weeks). Randomly the patient should be investigated not to take the drug on a casual basis and it is understood that it is not a substitute for attacks to be taken when pain develops.

There remains, however a small number of patients who are still described as having, for want of a better name, non-ulcer dyspepsia. Since the advent of endoscopy this group has become considerably smaller and it remains a diagnosis of exclusion. It is difficult to justify the use of cimetidine in these patients since we do not understand what we are treating.

While again emphasising the needs for diagnosis before treatment it is possible to summarise the present indications for the

use of this drug as follows:

I Duodenal Ulcer. Cimetidine should be given to patients with a first attack of acute duodenal ulcer and in the early relapses of chronic duodenal ulcer. The indications for surgery in these patients remain unchanged except in the elderly when consideration should be given to a full course of cimetidine followed by a lower dose as maintenance therapy. In all cases the safety and convenience of long-term therapy should be weighed against the morbidity and mortality of surgery.

II Recurrent Ulcer after Vagotomy. The above observations also apply to recurrent ulcer after surgery. While further operations may still be the treatment of choice, in some patients long-term maintenance therapy may be preferable.

III Gastric Ulcer. The importance of establishing the benign nature of the lesion must be stressed. Cimetidine should probably be given in preference to cimetidine as these patients but certainly in older patients and when the presence of renal insufficiency, hypertension or congestive cardiac failure renders carbonaceous dangerous because of its side effects. Repeat endoscopy or barium studies should always be carried out at the conclusion of six weeks treatment.

IV Reflux Oesophagitis and Biliary Ulcers.

Cimetidine should be reserved for refractory cases which have not responded to conventional treatment.

V Acute Gastrointestinal Haemorrhage. Cimetidine either intravenously or orally should be given in all cases of acute gastric or duodenal ulcers. It may also be helpful in patients with duodenal or gastric ulcers which are being managed conservatively but it will be of no use when bleeding is from a single visible blood vessel.

VI Zollinger-Ellison Syndrome.

Cimetidine should always be used either to prepare the patient for surgery or where

surgery is contraindicated as long-term therapy.

Dosage

Cimetidine should normally be given by mouth at a dose of 300 mg with meals and 400 mg on retiring at night. The night dose is more effective if the patient goes to bed fasting and has had nothing to eat or drink apart from water after his evening meal which should be taken early. Available evidence suggests that four to six weeks is sufficient to produce healing of the majority of duodenal and gastric ulcers. The dose for maintenance therapy is probably 400 mg at night with the same process about the evening meal. Cimetidine is available for intravenous use when it should be given at a dose of 100-200 mg but an intramuscular preparation is not at present available. A syrup may be prescribed when tablets cannot be taken.

Conclusions

Cimetidine is an exciting new drug which is likely to prove of great benefit to many patients both therapeutically and prophylactically. Its economic benefits will be of particular value to the fiscal services whose costs with gastro-duodenal disorders are likely to reduce these ships rather than less than the case in the past. Its use in the absence of specific indications however is likely to be expensive and ineffective.

References

1. A. L. F. and J. W. B. (1974) *Receptors*, including some notes on 13 receptors. *British Journal of Pharmacology and Therapeutics*, 29, 437.
2. H. J. B. (1974) *Receptors*, 2, 13 and 14.
3. W. J. B. (1974) *Receptors*, 2, 13 and 14.
4. J. W. B. (1974) *Receptors*, 2, 13 and 14.
5. J. W. B. (1974) *Receptors*, 2, 13 and 14.
6. J. W. B. (1974) *Receptors*, 2, 13 and 14.
7. J. W. B. (1974) *Receptors*, 2, 13 and 14.
8. J. W. B. (1974) *Receptors*, 2, 13 and 14.
9. J. W. B. (1974) *Receptors*, 2, 13 and 14.
10. J. W. B. (1974) *Receptors*, 2, 13 and 14.

The Use and Abuse of Steroids in the Eye

A. J. Rinkel

ABSTRACT

The value of corticosteroid drugs in the treatment of inflammatory conditions of the eye is emphasized and their use is described. Attention is drawn to the risk of serious side effects with prolonged use and the importance of ophthalmic supervision.

The use of corticosteroid drugs in the eye has been of enormous value in the treatment of many inflammatory diseases. Since vision is usually dependent on the formation of a clear image and its analysis in terms, colour and spatial location by the optic, clarity of the refracting surfaces and media is of paramount importance. It is in the restoration of clarity of these structures that corticosteroids have proven their worth. However, this can only be achieved at the expense of depressing defence mechanisms and alteration in metabolism of ocular tissues. The use of steroids in the eye therefore requires fine clinical judgment and almost day to day supervision in the acute stages of ocular disease. It is usually in the lack of close supervision that the abuse of steroid drugs takes place.

Lids and Conjunctiva

Steroids are useful in all forms of allergic reaction of the eyelids. Short term reactions such as vesicular dermatitis and squamous blepharitis present no problems and the topical use of potent steroid eye drops 0.5 per cent (Frued¹) or Betamethasone 0.1 per cent (Durston²) rapidly restores the condition. Caution should be reserved for use at night once the gritty lens produces temporary blurring of vision. An attempt

should be made to identify the allergen, elements using which are topical antibiotic preparations and avoid spectacle frames.

Other allergic diseases such as hay fever and vernal catarrh may last throughout spring and summer. Relief of symptoms may be obtained but requires the continued use of topical steroids for many months. It is in this situation that dangerous side effects such as Steroid Glaucoma, and Steroid Cataract may appear.

Steroid Induced Glaucoma

It has been proven that in certain susceptible individuals the ocular pressure rises dramatically with the use of topical steroids in the eye over relatively short periods (Frumkin, House-DeRios & Tsigalis, 1966). They found that 16 per cent of the normal population showed this response increasing to 30 per cent in patients of glaucoma patients. Since then a number of cases of secondary glaucoma with cupping of the optic discs and field defects after the use of topical and systemic steroids has been described (Miller, 1968). Although the rate of intraocular pressure is controlled on cessation of the drug (Frumkin *et al.*, 1966), cupping of the optic discs and glaucomatous field defects are permanent. Persons who require treatment with topical or systemic steroids for periods longer than a few weeks should have intraocular pressure measured initially and at regular intervals thereafter.

Steroid Induced Cataract

The long continued use of topical or

sympathic stimuli can produce posterior corneal film opacities. Cross (1965) described 25 varied cataracts found in a series of 79 patients treated with 30 mgm. Prednisolone per day or more over a period of 3 years.

More recently posterior capsule film opacities have been reported arising from the long term use of steroid syringes in young patients (Graham & Hollows, 1974). Every attempt should be made to keep dosage to a therapeutic minimum with unexpired periods of treatment.

The pathological adhesion of two apposed corneal surfaces known as synechia occurs in children after trauma and chemical injury to the eye. The frequent use of a steroid ointment should be started immediately, combined with the use of a glass rod to sweep the synechia.

The use of steroids in cases of the lute should be strictly limited to periods of active disease and always in conjunction with an antibiotic to control infection. Indiscriminate use of steroids such as hexamethacene and dexamethasone tends to increase the tendency to intussusception of the vessels of the lute macula with which this condition is associated.

In the same stage of the Shwartz-Kohnen Syndrome the use of steroids topically and/or systemically may be of little avail.

Cases

The therapeutic action of steroids on corneal disease can be awarded to the prevention of corneal vascularization or the resolution of corneal oedema. The cornea is an avascular structure. Persistent corneal oedema associated with breakdown of stroma allows the ingress of new vessels with corresponding reduction in visual acuity. This is well illustrated in various instances and as the oedema lessens of course the ingrowing corneal disease. In both these cases the judicious use of topical corticosteroids may prevent blindness. It

should be noted that steroids delay epithelial healing and reduce the corneal strength of normal wounds (Hessell 1966). They have no place in treatment of normal trauma other than in exceptional circumstances and under ophthalmological advice.

In the topical management of corneal grafts steroids can be used to reduce and prevent vascularization and to reduce opacification caused by immune rejection phenomena. It is of particular importance to note that steroids must never be used where dendritic ulceration due to simplex infection is present. The virus is potentiated by steroid drugs and the superficial dendritic ulcer may deepen rapidly and progress to corneal perforation within a few days. Separation with fungus has been reported in diseased corneas treated with long term topical steroids (Thompson & Ollmann 1974) although this is still a rarity in the United Kingdom.

Units

A small proportion of cases is associated with systemic disease. Most cases are idiopathic in nature and manifest a large element of acute hyperinflammatory reaction in an occlusive reaction. Since infection is rarely implicated steroids used over short periods will result in dramatic improvement. In milder cases steroid drops used two hourly and frequent at night will be sufficient. Severe cases with marked vision loss should be treated with subconjunctival injection of methyl prednisolone (Depo Medrone). This is a depot steroid whose effect lasts for 4 or 5 days. Those which do not show marked improvement within 48 hours will require systemic therapy with drugs as high as 40 mgm prednisolone daily for a few days. History of the graft by inspection and other techniques should not be neglected. The use of topical steroids may have to be continued for several weeks after the

disproportionate of inflammatory signs in the eye, treated or healed.

Choroidal arthritis

Most cases of choroidal arthritis are due to granulomatous disease and result in focal lesions. Vision may be lost due to vitreous opacities or the production of the focus on the posterior pole of the eye, destroying the visual 'picture' at the macula.

In combination with specific treatment for the infection, the use of systemic steroids may be required to save sight if the focus is near the macula as commonly happens in ocular toxoplasmosis.

Post vascularitis Retinitis

On occasion, allergic reaction in the eye to systemic disease may be confined to the retinal vessels resulting in recurrent bleeding into the vitreous, choroidal and exudates of the affected vessels. This is often bilateral and systemic steroids will be required over long periods to damp down the post vascular reaction.

Giant Cell Arteritis

Sudden loss of vision in the elderly accompanied by tenderness and signs of occlusive vascular disease in the eye must alert the clinician to the possibility of central arteritis. If the ESR is significantly

raised, the administration of prednisolone 40mg daily should be started immediately, without waiting for the result of a temporal artery biopsy. It is becoming increasingly apparent that commencement of the steroids may take place even after many months treatment with steroids on resolution of the inflammation and a small maintenance dose may be necessary for very long periods.

In conclusion it may be said that the short term use of steroids in diseases of the late and consequent is of value and without significant side effects. It need be more than a few weeks' administration in severe cases. The use of these drugs in other eye conditions is best left in the hands of the ophthalmologist.

References

- CHERRY, S. J. (1965) *Anterior uveitis: its aetiology, clinical changes in the eye, dependence of the final degree of blindness*. M. Thesis.
- FRANKLIN, J. (1970) *CHOROIDITIS: A REVIEW*. B. F. (1960) The vitreous and the vitreous of disease, eye and vision. *Journal of Ophthalmology*, 65, 594-602.
- MACVITTIE, A. S. & MILLER, S. T. (1970) *Posterior subcapsular cataract after topical corticosteroid therapy*. *British Ophthalmology*, 13, 464-468.
- MILLER, S. J. B. (1965) *Retinal Granuloma*. Transactions Ophthalmological Society, London, 85, 344-350.
- SIMMONS, F. W. (1961) *Some aspects of a central and chorioretinal vasculitis*. Transactions Ophthalmological Society, London, 81, 111-121.
- STEWART, F. & OKINAKA, M. (1970) *Retinopathy - a pathological study*. Transactions Ophthalmological Society, Ophthalmology, 70, 105A-107B.

PUBLICATION BY RN MEDICAL OFFICER — ABSTRACT

SHALL, F. W. (1970) *Ocular Inflammation*. *British Journal of Ophthalmology*, 54, 51-52.

Ocular inflammation is a frequently occurring problem which may become by the RN as outlined in the hospital specialist. With the benefit of institutional advice

both for diagnosis and therapy, these eyes can have more in diagnosis and treatment. The need for education, especially self-aided education in ophthalmology is becoming a reality with a proportionate of the resources to meet and maintain a clinical competence.

The Use and Abuse of Topical Corticosteroids

M. D. Curran¹

ABSTRACT

A structured approach to topical corticosteroid therapy is presented. Factors which influence the choice of preparation are explained, based upon the concept of "rank order" for both biological and non-biological steroids. Practical considerations including choice of base, preparation technique, and application are discussed. Evidence and systems are specific considered to date.

Introduction

Since topical corticosteroids were introduced in 1951, there has been a tendency for many doctors to use them as a panacea for skin disease. The movement in this direction has been perpetuated, at least in part, by the reluctance of many pharmaceutical companies to gain a foothold in this lucrative market. Consequently, over recent years there has been a dramatic increase in the number of topical steroid preparations, many of which offer no real advantage over those previously available and the doctor commonly finds himself overwhelmed by the choice which confronts him (Fig. 1). The purpose of this review is to present a reasoned approach to topical corticosteroid therapy and to highlight the hazards which may result from their misuse.

The Concept of "Rank Order"

A rational approach to topical corticosteroid therapy requires a basic understanding of developments which have occurred in this field. Hydrocortisone exerts only mild anti-inflammatory activity when applied topically to standard lesions and even after its introduction the requirement for more potent derivatives became apparent. Halogenation (usually fluorination) of the steroid nucleus generally increases the

Preparation	Strength	Form	Indications
Hydrocortisone	1% w/w	cream	eczema, dermatitis
Hydrocortisone	1% w/w	ointment	eczema, dermatitis
Hydrocortisone	1% w/w	lotion	eczema, dermatitis
Hydrocortisone	1% w/w	powder	eczema, dermatitis
Hydrocortisone	1% w/w	tablet	eczema, dermatitis
Hydrocortisone	1% w/w	injection	eczema, dermatitis
Hydrocortisone	1% w/w	suppository	eczema, dermatitis
Hydrocortisone	1% w/w	capsule	eczema, dermatitis
Hydrocortisone	1% w/w	cream	eczema, dermatitis
Hydrocortisone	1% w/w	ointment	eczema, dermatitis
Hydrocortisone	1% w/w	lotion	eczema, dermatitis
Hydrocortisone	1% w/w	powder	eczema, dermatitis
Hydrocortisone	1% w/w	tablet	eczema, dermatitis
Hydrocortisone	1% w/w	injection	eczema, dermatitis
Hydrocortisone	1% w/w	suppository	eczema, dermatitis
Hydrocortisone	1% w/w	capsule	eczema, dermatitis
Hydrocortisone	1% w/w	cream	eczema, dermatitis
Hydrocortisone	1% w/w	ointment	eczema, dermatitis
Hydrocortisone	1% w/w	lotion	eczema, dermatitis
Hydrocortisone	1% w/w	powder	eczema, dermatitis
Hydrocortisone	1% w/w	tablet	eczema, dermatitis
Hydrocortisone	1% w/w	injection	eczema, dermatitis
Hydrocortisone	1% w/w	suppository	eczema, dermatitis
Hydrocortisone	1% w/w	capsule	eczema, dermatitis

Fig. 1. Topical corticosteroid preparations available in the United Kingdom.

potency of the drug (Fig. 2). By varying the structure of the halogenated steroids and/or the concentration of steroid in an appropriate base, a wide range of halogenated steroids has been developed. A second approach has been to avoid halogenation, but to enhance potency by modifying the hydrocortisone molecule in other ways e.g. hydrocortisone 17 isobutyrate (Lacod) More recently this because of undesirable side effects resulting from the use of potent halogenated steroids, attempts have been made to correct the low availability of hydrocortisone by improving its vehicle and thus enhancing percutaneous absorption.

Assessment of the relative potencies of various preparations has relied mainly on the McGonigle and Slaughter branching test

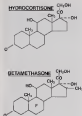


Fig. 1

(McKenzie and Boughton, 1962) and its modifications (Barry and Woodhead, 1954). A relationship exists between the ability of a topical steroid corticosteroid to induce blanching and its ability to alterate inflammation (Fleiss, Velezquez and Burdick, 1976). Consequently, the blanching test is a reasonable method of assessing the relative efficacy of various topical corticosteroid preparations and a large volume of data has been accumulated which relates vasoconstrictor activity to potency. This information can be employed to allocate the available preparations into a "Rank Order". Appropriate lots can be constructed for balanced studies (Fig. 3) and hydrocortisone derivatives (Fig. 4). With few exceptions, usually the only balanced combination, there is little to choose between members of the same "rank". If the investigator uses or perhaps two preparations from each "rank" he will

be adequately equipped to deal with any stated response derivation. He should then endeavor to become acquainted with the literature for each of the preparations selected and adopt it as his.

Rank Order and Typical Corticosteroids [Hydrocortisone Derivatives]

- A HIGH POTENCY — BECLAMETHASONE
FLUOMETHASONE
Dexamethasone
Triamcinolone
- B MODERATE POTENCY — BETAMETHASONE
METHYL PREDNISOLONE
ALCLAMETHASONE
- C LOW POTENCY — HYDROCORTISONE
HYDROCORTISONE BUTYRATE
HYDROCORTISONE VALERATE
- ACETONYL
BETAMETHASONE
VALERATE
ALCLAMETHASONE
- HYDROCORTISONE
VALERATE
HYDROCORTISONE BUTYRATE

Fig. 3

Rank Order and Typical Corticosteroids [Hydrocortisone Derivatives]

- A HIGH POTENCY — DEXAMETHASONE
- B MODERATE POTENCY — BETAMETHASONE
METHYL PREDNISOLONE
ALCLAMETHASONE
- C LOW POTENCY — HYDROCORTISONE
HYDROCORTISONE BUTYRATE
HYDROCORTISONE VALERATE
- HYDROCORTISONE BUTYRATE
HYDROCORTISONE VALERATE

Fig. 4

Practical Considerations

Dilution

Dilutions of topical steroid preparations are used by many dermatologists for two main reasons. Firstly dilution can make weak stronger units, particularly in hospital practice. For example a .50 percent rate of a relatively potent preparation, when diluted 1 to 4 on an isotonic base, will produce 125 percent of steroid with a potency equivalent to one to two "ranks" below the original, at both sides out. This argument is, however, not quite as valid

when used, creams are used once dispensing units may well almost negate the theoretical saving. Secondly the use of creams increases the variability of any one preparation: it may be used neat when a powerful steroid is required and diluted perhaps 1 in 4, 2, or even 10 when a weaker preparation will suffice. Consequently the number of products with which the doctor needs to be conversant can be reduced even further.

Creams are probably best left unadvised, in view of the hazards of bacterial contamination but creams do not present a significant problem in this respect. Most creams will elicit quite satisfactorily in when not paraffin (e.g. Dermacreme, Balmecra). Propellants, but none will get (e.g. Ilexol) and this is usually made quite apparent by the manufacturer.

Onion Cream or Ointment?

An element of mystery surrounds the indications for using an ointment, cream or lotion. Ointments are greasy and should be used for chronic conditions characterized by dryness and scaling. A single application remains effective for about eight hours and should therefore be applied two or three times daily. These virtues make them difficult to use in flexural areas on the scalp and on the feet and they are better avoided on these sites.

Creams tend to exert a mild desiccating effect on the skin, although some create poppycock, particularly those in a urea base (Alphaderm, Calomel), do in fact hydrate the skin. In general, creams are indicated for acute and subacute conditions in which some exfoliation and crusting may be apparent. They are very acceptable for any flexural or facial dermatosis and may be used on the scalp. Each application remains effective for perhaps four hours and creams should therefore be used four times daily. Lotions have an extremely short duration of action,

in the order of one or two hours and therefore require very frequent application. They have a considerable desiccating action and are indicated only in the acute exudative stage of eczema. In this situation, emulsions of potassium permanganate or Buroso's solution are often preferred: they rapidly dry in acute eczema and thus prepare the surface for appropriate cream. A number of steroid lotions are marketed for application to the scalp. They are cosmetically very acceptable but will not cope adequately with more than minor scaling and irritation.

Ointment

Ointments of a steroid stored under thin polythene occlusion permit almost absorption by a factor of about 100. This technique may be particularly useful for stubborn cases of chronic eczema or psoriasis affecting the hands and feet and also for lichen planus, especially in its hypertrophic form. When used for these conditions the steroid ointment should be applied under polythene overnight but even for most cases 12 hours or say one day. As the condition responds the frequency of ointment can be gradually reduced.

It is worth remembering that there is a natural occlusive effect in the flexures and that the potency of any given steroid will therefore be proportionately greater. The thin heavy tapes on flexural skin, together with the occlusive effect, make these areas particularly prone to steroid induced atrophy.

Talcylolololol

Recent work (Jin, Furer and Sirochman, 1975) has demonstrated that in common with many commercially administered drugs, the efficacy of a topical chlorinated hydrocarbon falls quite some if it is applied to the skin at regular intervals. Only a brief lapse in treatment appears to be necessary to restore useful therapeutic



Fig 3. Acne vulgaris covered with a 10 per cent hydrogen peroxide



Fig 4. Clear (improvement)

syndrome which has become common over the last decade. The patient is usually a young or middle aged woman who has approached her doctor for advice about facial variants of the syndrome of oily papules, which she associates but sometimes the preceding lesions are probably more severely comedonal. A hydrogenated steroid is prescribed, which is usually found to be beneficial. However, as time passes with attempt to stop treatment results in a rebound and gradually a fixed per-oral strapes of comedones, papules and pustules develops. Alternatively more widespread and prolonged application may induce frank rosacea, not strictly localized to the comedonal area.

Both conditions respond instantly well to Tetracycline given orally in a dose of 250 mg twice daily for perhaps two weeks, reducing thereafter to 125 mg daily for a further two to three months. During the

initial stages of treatment it may be advisable to cover the 'rebound' which occurs on stopping the hydrogenated steroid with 1 per cent hydrocortisone cream. Tetracycline helps to improve the situation in about four weeks and topical therapy can then be withdrawn. Frank rosacea often relapses, even after three months therapy.



Fig 5. Free and clear skin



Fig 14 Face

and treatment with small doses of Tetracycline must be continued until remission occurs.

Prevention of Erythema

Topical steroid therapy is contraindicated in extensive bacterial, viral or fungal infections: a situation analogous to that which exists in relation to systemic corticosteroid therapy and infection.

The widespread nature of topical steroids in dermatophyte infections has again produced a distinctive dermatosis described as *Tinea Incognito* (Jen and Jellish, 1964). Not only may the original dermatophyte infection be converted into an indolent, almost unrecognizable form (Fig 15) but continued application of steroid may induce fungal growth in barren sites.

Prevention of Wound

Delayed wound healing is a well

recognized consequence of corticosteroid therapy, but patients still present with ulcersous lesions (usually about stents of the lower limbs) in which steroid creams and ointments have been applied.

Fluoride Poisoning (Fig. 11)

There is a growing body of evidence implicating potential fluorinated steroids in the aetiology of some cases of periodic paralysis (Baker and Ryan, 1966; Sengupta and August, 1970). This consideration arises in connection with such preparations are used for the treatment of psoriasis. Fluorinated steroids may actually become available and erythematous and in this state rebound symptoms with paralytic is likely on withdrawal of the steroid.



Fig 15 Tinea incognita



Fig. 11 Paronychia

Systemic Side Effects (Fig. 12)

Adrenal Suppression

Percutaneous absorption of topically applied corticosteroids is enhanced in denuded skin when the integrity of the horny layer is disrupted. In patients with widespread chronic eczema or psoriasis the use of large quantities of potent halogenated steroids may produce significant suppression of the Hypothalamic-Pituitary-Adrenal (HPA) axis. Patients using more than 50 grammes of chlorbutol propionate (Dermovate) weekly almost all show significant suppression of the HPA axis and those using more than 100 grammes weekly show profound suppression and may develop symptoms of adrenal cortical insufficiency on withdrawal (Corrallan, August and Naughton, 1975). Adrenal suppression does not however appear to be a significant hazard for the majority of adult patients

(Schwartz and Clark, 1973), but infants and young children are more susceptible particularly those with widespread dermatoses such as eczema, ichthyosis, dermatitis, atopic eczema, or capillary pyoderma.

SIDE EFFECTS OF TOPICAL CORTICOSTEROIDS

THE SKIN

1. ADRENAL SUPPRESSION

e.g. 100g Dermovate weekly
clinically reversible and reversible in adults
important in infants and prepubertaries

2. SYSTEMIC SUPPRESSION OF CORTICOSTEROIDS

3. CUSHING'S SYNDROME

Fig. 12

Cushing's Syndrome

This effect of systemic corticosteroid therapy in childhood is well recognized. The child with atopic eczema or psoriasis may also be at risk through long term exposure to powerful topical steroids. The most potent preparations should probably be avoided completely in the growing child and only used marginally for relapse in atopic eczema. Maintenance therapy should be based upon preparations at the lower end of the halogenated 'scale' of potency of medium potency steroids or hydrocortisone. Mild and moderate cases of atopic eczema or psoriasis can often be managed largely with non-steroid preparations, mainly derivatives of tar or vitamin D.

Cushing's Syndrome

Application of large amounts of potent halogenated steroids over several months can lead to frank Cushing's syndrome. Naughton and August (1975), reported three patients who developed frank Cushingoid features after applying more than 100 grammes of chlorbutol propionate (Dermovate) each week for periods of between two and eight months.

A Complication of Upper Third Molar Extraction — A Case Report

T. J. C. Hall

ABSTRACT

The apparently straightforward removal of an unerupted upper third molar was followed by numbness of an area of the palate. An explanation of this apparent complication of extraction is offered and the etiology of the greater palmar nerve in the third molar is described.

Introduction

Post-operative dysfunction of one or other of the sensory branches of the trigeminal nerve is a well recognized complication of surgery for the removal of impacted lower third molar teeth (Killey and Kay, 1978). Trauma to a peripheral nerve may arise from compression by stretching of the nerve and interference with function will follow if neurapraxia, axonotmesis or neurotmesis occur. An examination of the literature and experience suggest however that such problems are seldom encountered with the removal of upper third molars. A case where palatal numbness followed extraction of a third molar tooth is described.

Case Report

Miss D. C. aged 19 was admitted to hospital for the removal of impacted lower third molar teeth under general anaesthesia following recurrent episodes of pericoronitis. It was decided that the unerupted upper third molars should be removed at the same time to avoid the need for possible further surgery in the future (Fig 1).

A standard buccal approach was made to the moderately highly placed upper left third molar tooth with the flap raised across the tuberosity and forward, round the



Fig. 1. Reflection showing the unerupted upper left third molar tooth.

gingival crevice of the second molar and thence vertically into the sulcus (Hawes, 1966). The overlying buccal bone was removed with a chisel to give a point of application for a curved Warwick James elevator and the tooth was delivered in a downwards and medial direction. A peridental elevator was placed on the posterior surface of the tuberosity to retract the flap and guard against accidental posterior displacement of the tooth. The tooth was rather more resistant to elevation than usual but there was no suggestion of fracture of the tuberosity.

Post-operative recovery was unremarkable apart from a complaint of numbness of the left side of the palate. The patient reported difficulty when taking hot and cold foods. Examination revealed an area of true numbness of the hard palate forward to

the canine tooth. A further area of abnormality existed on the buccal alveolar process in the molar region. There was no abnormal form of the soft palate and gingival pulp tests showed a reduced response from the molar and the premolar teeth compared with those of the right hand side. The area of palatal anastomosis began to resolve after 3 months when stimulation was experienced and full recovery had occurred by 6 months.

Discussion

Examination of a skull (Fig. 2) shows that the apex of an unerupted upper third molar could be close to the greater palatine canal in some individuals, especially if the tooth has a separate palatal root or is lying with the crown facing buccally. It is postulated that such a close relationship existed in this case and that elevation of the tooth led to pressure by the root upon producing stimulation of the greater palatine nerve and anastomosis of the palate. The reduced pulpal sensation of the premolar and the molar teeth may be explained by the damage to the posterior superior dental nerves rather than they run in the posterior lateral wall of the maxilla or before they entered their foramina on the posterior aspect of the maxilla, by the high placement of the periodontal elevator guard. Similarly damage to the gingival branch of these nerves would account for the area of buccal anastomosis.

Although the contribution to the patient caused by these nerve injuries was slight, it is as well to be aware of the possibility of this problem when removing highly placed upper third molar teeth. Kelley and Kay (1974) comment that there is often little indication to remove such teeth as they seldom give rise to symptoms. However, the possibility of subsequent sudden dangerous eye irritation and the advantage to the patient of carrying out all the surgery that may be required under one



Fig. 2. Patient's skull showing the relationship of an unerupted upper third molar to the greater palatine canal (Maxilla only). (Anteroposterior view). (Dental Hospital Museum, Liverpool). Specimen No. 1174.

general anaesthetic should be considered when planning treatment.

Acknowledgments

I wish to thank the Honorary Curator of the Osteological Museum of the Royal College of Surgeons of England for Figure 2.

References

- ROHMERT, J. (1956) *Upper Third Molar Teeth* (Wright & Sonnet) p. 65.
- SCULLY H. T. & KAY L. W. (1974) *The Impacted Wisdom Teeth* 2nd ed. Birmingham: Churchill Livingstone, p. 53, 63.
- YATES C. & GIBBS J. P. (1970) *British Journal of Orthodontics* 14, 177-178.

that since this article was submitted Peter A. Kelly (1976) has published a case of unilateral nerve palsy after a similar procedure to the one presented here.

Stenosis of the Larynx and Trachea due to Trauma

F. D. Jackson

ABSTRACT

Stenosis of the larynx and trachea as a result of trauma is becoming an increasingly common problem. This paper reviews the aetiological and pathogenic factors, the management of established stenosis and the measures to minimise trauma and stenosis. Some illustrative cases are presented.

Introduction

The problem of stenosis of the larynx and the trachea as a result of trauma is of importance not only to otolaryngologists but also to anaesthetists, casualty officers, general surgeons and those working in Intensive Care Units. Although it has been the subject of several recent papers there is considerable disagreement as to how a stenosis here it can be prevented, what the clinical problems are and how the stenosis should be managed. Seven cases which have been presented at the Royal Naval Hospital, Plymouth in recent years are here reported.

Anatomy

The larynx and upper trachea are protected behind by the cervical vertebrae but are vulnerable from the front although a large measure of protection is given by the proximity of the manubrium sterni and the clavicles and, more importantly, by the mandible. Also in the normal position the mobility of the larynx allows it to move away from the force of blows upwards. However it becomes particularly vulnerable when the neck is extended. In this position the larynx is prominent, the mandible well clear of it and the strap muscles are stretched in between the inside and the upper trachea being drawn further into the neck, now becoming vulnerable. A further factor which

may predispose the airway to damage from blunt mechanisms is the tendency of a victim to hold his mouth against the closed glottis when in conscious danger, further reducing the mobility of the already distended (Sext 1971). These circumstances come together when the extended neck is forced against an unyielding structure, such as a dashboard or a steering wheel, (Fig. 1a). Laryngeal injuries have also occurred in basketball when the victim has been looking upwards, and also in tennis (Marras & Seal 1970).

Most commonly, however, an injury resulting in stenosis is produced by direct stretching with the airway. Passing an endotracheal tube when there is need to hurry, or the point is difficult, may damage the arytenoids or vocal cords. At this level the greatest displacement by an endotracheal tube of the normal structures (in the narrow crescent shaped glottis)



Fig. 1a. Aetiological factor in laryngeal injury (Sext 1971).

anterior of the anterior ends of the vocal processes of the arytenoids (Ludlow, 1969). Damage here typically subsequently presents as hoarseness due to a granuloma on the arytenoids. [Injury] damage may result from an endotracheal tube being in use for less than one hour (Donnelly, 1969) (Case 1).

Below the vocal cords the sub-glottic region is particularly susceptible to damage. (Tanner 1964) as this region is narrow and is surrounded by a complete ring of cartilage. The muscle and the tissue cannot therefore fold to protect. Donnelly (1969) points out that the configuration of the glottis protects the sub-glottic tube backwards and by shows that it is posteriorly in the sub-glottis that pathological changes are most pronounced. At a lower level the cricoid muscle, in the membranous air. This may be due to the anterior wall of the trachea being pushed forward, as will occur if a simple tracheostomy is made into the trachea or if a tube too large for the stoma is pushed through (Case 6, Fig 3a). If a window is cut into the trachea and cartilage removed, this area will heal by fibrous tissue which will produce a stenosis both by contraction of the scar and by lack of support to the area, leading in turn to collapse on inspiration. (Case 5) Even if a flap is fashioned rather than the usual removal of the tracheal wall the cartilage

does not survive on the flap and the defect becomes filled by scar tissue. Clearly the main of the tracheal wall which is retained the greater will be the problem. The loss of tissue will generally be greater if a flap is made rather than a simple tracheostomy, the flap has to be of sufficient size to suture forward, generally to the skin or subcutaneous tissue.

Below the membranous air, injury to the tracheal wall occurs when a rigid tube does not align with the trachea. This generally results in the end of the tube impinging on the anterior wall of the trachea (Fig. 2b). At a lower level the tracheal mucosa is at risk from the top of the canula (Fig 3b).

When a cuffed tube of the nasal pattern is used, the horn-shaped trachea is deformed to become circular in cross section as the cuff is inflated. Here pressure is more likely to be damaging over the underlying anterior part of the trachea (this local distortion occurred anteriorly and laterally in Donnelly's series).

Case 1

WGL, a 51 year old male, underwent left upper lobectomy in June 1973. An Oxford 10 mm outer cuffed and endotracheal tube was used and his consciousness was unimpaired. In January 1974 he was seen at the RNT



Fig. 2. Tube introduced from tracheostomy and into lumen.



Fig. 3.

a. J-shaped displacement of anterior tracheal wall by membranous tube.

b. Injury due to U-shape alignment of trachea with membranous tube.

department complaining of haemoptysis which he had noticed soon after his operation and which was becoming worse. Indirect laryngoscopy showed a large polypoid mass on the left vocal cord and this was removed under anaesthesia some days later. The pathology report was: *Shaggy cords with a variably normal squamous epithelium with one small focus of keratinization. One end of the epithelium is in direct contact with shaggy but it is not apparent whether the shaggy presents epithelial abnormality or is covered in the supporting right tissue deep to the epithelium. Surrounding the shaggy on one side there is a mass of vascular granulation tissue. The appearance are those of tumor against such an acute tissue reaction. There is no apparent intrinsic reason for these appearances which are consistent with dead tissue.* When sent for review in April 1955 both vocal cords were found to be slightly undergrown and there have been no further outward developments.

Case 2

M.D.C., a 34 year old female was involved in a quarrel in the early hours of Christmas Day 1954 in the evening disturbance her head being through a partially lowered car window was pushed forcibly downwards with the result that the edge of the window frame was violent contact with her neck. On admission there was slight tenderness and bruising on the right side of the neck and back blood on the throat. Nothing was not laboured though there was slight under. There was some pain on swallowing. Indirect laryngoscopy showed some bruising of the aryepiglottic folds, some water beads and vocal cords but the laryngeal strict stenosis was virtually symmetrical and there was no suspicion of cartilaginous injury. Direct laryngoscopy on 8 January 1955 showed supra-glottic oedema and some swelling and fibrosis at the anterior commissure. The vocal cords were seen to be normal. However the

quality of her voice gradually deteriorated and on 2 April 1955 a supra-glottic web was divided in the middle under microscopy and normal adjacent vocal cords revealed. Despite this encouraging finding, she was no longer paid specifically. On 23 July 1955 after performing a tracheostomy a supra-glottic stenosis was divided by a large incision approach and a trachea, short secured between the two incisions. The portion of this was checked by direct laryngoscopy at the end of the procedure (Fig. 3). The split was removed on 29 August 1955 and on 26 September 1955 a sub-glottic plug was removed. At this time the airway was good and the voice while not perfect was much improved. Unfortunately there was further gradual deterioration. By July 1956 the voice was again poor and the patient found this was becoming breathless on shopping and on climbing the stairs to her flat. Once the indirect laryngoscopy however showed that the stenosis was now occupying only half the length of the vocal cords. On 1 December 1956 another large incision approach and the removal trachea was done.

Case 3

C.T., a female aged 74 was admitted on 23 November 1953 with multiple injuries after a road traffic accident. She was confined but conscious with a third segment of the chest and a tracheostomy was sited. Ray was intubated. The left leg became very bruised and the skin broke down after extensive de-shagging this was grafted on 11 December 1953. On 9 January 1954 she was found to have a right vocal plug and on 29 January 1954 the eye was removed because of a hyphema. She was ventilated for a total of six weeks and the trachea deflated on 14 January 1954 on inflated under general anaesthesia. On the following day Tracheostomy was recorded as closed on 4 March 1954 but the next day there was under and microscopy showed sub-glottic



Fig. 1 (left), 2 (right), anterior and lateral views.

swallow (Fig. 4). She was discharged from hospital on 5 April 1979 but was readmitted as an emergency on 22 May 1979 with stridor at rest. Indirect laryngoscopy revealed widely abducted vocal cords and through them the field presented a subglottic pink mass measuring 15 mm in the subglottic region and behind this a less patent lumen. Under microscope twelve days later oesophagofibrescopes were passed through this but she became cyanosed the next day and an endotracheal tube (size No. 7 Childs) was passed as an emergency. On 2 July 1979 a tracheal incision was carried out, the length of about 2 cm of tracheal cartilage immediately below the right

arcus being excised and the ends sutured over a 7.5 millimetre uncuffed tube. This tube was removed after 48 hours and there was immediate respiratory obstruction requiring reintubation. She did not tolerate the tube and further emergency intubation was carried out, complicated by an oesophago-tracheal fistula (Fig. 5). This closed spontaneously but because of her age, general physical condition and her having had a series of operations it was felt that she should have a speaking tube permanently in the trachea rather than any further interference. Therefore she was very keen to do without the tube and on 5 December 1979 a bronchoscope passed easily and in the vicinity where adequate the tracheostomy was allowed to close. She was then seen to have a left vocal paralysis probably due to the tracheal incision. Since that time the airways have remained patent and her activities have as far as can be ascertained because of the poor location of the right lower limb. She has now been persuaded to accept a tracheostomy with a speaking tube.

Case 2

M.H., a 28 year old male, was admitted on 27 August 1972 as an emergency following a road traffic accident (Fig. 6).



Fig. 4 Case 1. Endoscopy showing subglottic air mass.



Fig 5 (cont.) Post-operative chest wound.

He was driving his vehicle wearing a lap and diagonal seat belt when he was involved in a collision with two other vehicles the first being fatal to them. There had been no loss of consciousness and he had a prompt recollection of the accident. He was found to have right-sided emphysema of the neck and resisted any attempt to move his neck; he told later of how he was afraid of not being moved. General anaesthesia was induced for collection of a debrided flap. The anaesthesia on



Fig 6 (cont.) Preparation of flap for coverage.

including the McCall tube left a ridge about 12 inches below the vocal cords and there was then a rapid development of surgical emphysema in the neck (Fig 7). On completion of the operation the patient's respiration and colour were satisfactory. On 2 September 1973 an emergency situation developed with increasing dyspnoea, similar and extensive intravascular emphysema was being seen when there was spasm and occlusion arose. External cardiac massage produced a return of pulse and spontaneous respiration in under a minute and emergency tracheostomy was carried out on the bed. Once the incision was made into a grossly emphysematous neck devoid of landmarks the patient was sucking air



Fig 7 (cont.) Extensive neck and chest emphysema.

through a hole in the trachea. The tube was passed blindly without the trachea being defined. Some hours later the neck was explored under general anaesthesia. The patient was difficult to accept because of extravasated blood and air in the tissues. Therefore his early progress was straightforward and a tracheostomy tube was maintained in a place. Bronchoscopy on 12 October 1973 revealed no retained features and no

On November 1972 the tracheostomy tube was removed. However, on 18 November 1972 the temperatures were rising and repeat bronchoscopy showed masses of granulation at the level of the upper part of the tracheostomy. The trachea was stripped and granulations remained on the sternum. It was also seen that the anterior wall of the trachea was falling upwards above the level of the stoma. It was gelled into position by saline and Stoney described an improved position (Fig. 8a, b, c). On 18 November 1972 FEH, was 1.65 tons and post-operatively on 27 November 1972 it was 3.8 tons. Since then her respiratory function has been good. On bronchoscopy on 22 July 1976 the site of the stoma was seen but a large white bronchoscope passed through it quite easily.

Case 3

HD, a female aged 56, was admitted in an emergency on 4 October 1975 having been found collapsed. Twelve months previously she had been involved in a road traffic accident and because of chest injury a tracheostomy had been carried out elsewhere. She had made a good recovery from the accident but when that had been subject to bronchitis with attacks of coughing and dyspnoea. The day before admission she had been brought to the casualty department having been found collapsed in the lavatory of a restaurant. When seen on arrival there she was fully conscious, alert and oriented and was still breathing following a diagnosis of rough eczema. However, on the following day the arrival at hospital unconscious, cyanosed and having marked respiratory difficulty. She was given 100 per cent oxygen and although her colour improved she remained unconscious. It was clear that she was suffering from tracheal stenosis and as exploration of the neck the trachea was found to resemble an apparatus of moderate sized artery there were no outflaps, polyps. A vertical incision was



Fig. 8 (cont.)

- a. Lateral view of neck showing respiratory difficulty and site of anterior tracheostomy with the tracheostomy in situ.
- b. Persistence of stenosis after removal of the tracheostomy tube.
- c. Improved position following removal of collapsed segment.

made into this and a tracheostomy tube inserted. Following this her progress was straightforward and on 14 January 1976 the nasogastric segment (2.5 cm anterior in length) was dissected and removed, the trachea was mobilised and its end to end anastomosis carried out. Following this she made a good recovery and a tracheostomy carried out on 12 March 1976 (Fig 4a, b, c) showed only a slight irregularity at the site of repair. On 28 July 1976 a large white bronchovascular was passed with no appearance of a stricture.

Case 6

BWW, a male aged 19, was involved in a road traffic accident on 17 December 1973 while driving a motorcycle. When seen in the casualty department his rectal blood pressure was 50. He was unconscious and had a flat chest. There was a right-sided haemothorax and he was intubated with positive pressure ventilation. Ten days later tracheostomy was carried out. He was on a ventilator for 4½ weeks and made a straightforward recovery. In December 1974 while on a rehabilitation course he was intubally short of breath and was unable to continue the course. At this stage he was found to have a significant stricture and a tracheogram (Fig 13a, b, c) showed a stricture below the site of the stoma (marked on the skin by the metal ring) probably in the site of the 'raft' but the A.P. tomogram suggested there was also some stricture at the site of the stoma. Bronchography was carried out but this produced at best a marginal improvement and he was discharged from the Service because of undue breathlessness on exertion.

Case 7

DE, a male aged 36, was admitted on 11 April 1975 with a stab wound of the chest. He was conscious with marked air hunger and his blood pressure was not recordable on auscultation and there produced much blood and after a period of positive pressure



Fig 13. Fig 13. a tracheogram showing air and contrast filling the trachea.

ventilation via an endotracheal tube a tracheostomy was carried out with insertion of a large cannula. The following day, 15 April 1975, a tracheostomy was fashioned using a Bjork flap. Positive pressure ventilation was discontinued on 20 April 1975 and he was discharged on 21 May 1975 after a straightforward recovery. On 2 June 1975 he was readmitted as an emergency having had two flailing attacks while

Fig 10 Case 1

1. Tracheogram showing site of stricture. The metal marker is in the skin at the site of the tracheostomy wound.
2. Tomogram of tracheogram showing two segments of which the upper is in the site of the tracheostomy wound.



Fig. 1. (1) Large, irregular, dark area of injury or pathology on the lung.



travelling on a bus. He was treated with chest physiotherapy and discharged on 15 June 1975, only to be readmitted again on 23 June 1975 with similar wheals had been going wrong since his discharge. At this time he was breathless after walking only 50 yards. X-ray now showed a localized stenosis behind the manubrium and bronchoscopy on 30 May 1975 showed the stenosis to be thin and just below the tracheostomy wound. This stenosis was dilated with hot gauze. Following this he remained symptom free. Bronchoscopy twelve months later in June 1976 showed a just detectable constriction of lumen, more anteriorly at the site of the previous stenosis (Fig. 11).

Discussion

Acute stenosis due to trauma may result from (a) external violence or (b) surgical interference. From various cases (Royal

1972, Gault 1973) of cases presenting with stenosis of such degree as to require correction, the ratio of (a) to (b) is about 1 to 3 (this figure in any one series will naturally be influenced by the proportion of acute injuries from road traffic accidents admitted to the hospital; the figures in Table 1 are an approximation). The trachea is less commonly damaged by external injury than is the larynx. Except perhaps when the injury is a sharp instrument the residual damage is almost always a stricture between the vocal or less rigid well supported structures and the first ring of the more mobile trachea. This injury may well have occurred in case 4, it is in keeping with the anatomical comments — although the stenosis in this case was probably due to the tracheostomy.

Following the tracheostomy, should the tube come out accidentally soon after the patient has returned to the ward, there is presented a desperate emergency in the



FIGURE 10 (a) (b) and FIGURE 11 (a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n) (o) (p) (q) (r) (s) (t) (u) (v) (w) (x) (y) (z)

Table 1. Problems with noncollapsible support

TYPE	SUPPORT PROBLEM	RECOMMENDED TRACHEAL TUBE
CENTRICALLY	NO	NO
PERIPHERALLY	NO	NO
SPHERICAL STIFFNESS		NO
CUFF		NO

tube may be a threat to replace, particularly in a struggling, agitating patient. Largely because of this fear, it is advocated that the tracheal stoma be sutured in the skin (Banger 1970) or commonly a flange flap is fashioned for creating a horizontal shaped flap which extends upwards into the anterior wall of the trachea, hanging the flap downwards and securing it to skin or subcutaneous tissue. Such a flap, because it has to be of sufficient size to resist forwards, will result in greater loss of tissue from the trachea than if a simple window is cut. The result will deliver to the trachea a layer decompression because filled with unsupported fibrous tissue. In children this reinforced skin stoma is used to preserve tracheal tissue so as to ensure that, as far as possible, the tracheal tissue will be adequate to sustain life. For this reason it is generally recommended in the United Kingdom that the tracheostomy in children be a simple vertical incision although Poles, Johnson & Nemeth (1973) describe using a narrow flap. Now that the problem of a stenosis of the stoma is being increasingly recognized, should the continued use of the flange flap be further questioned? Control of the trachea in the early post-operative period can be ensured simply by hanging strip sutures placed around the tracheal cartilage, one through the second. The vertical incision would need to be of adequate length, perhaps through three rings of the anterior tracheal wall in order to be pulled upwards. As internal stenosis would be displaced laterally rather than actually removed to make space for the tube, one might expect less stenosis. If positive pressure ventilation is not

required, and if a cuffed tube is not necessary, a stilet tube which is both long (and therefore less likely to dislodge accidentally) and flexible may be an alternative alternative.

The trachea and neck are outside and within hosts move independently. The larynx and trachea move upwards and then downwards on swallowing while the neck keeps still — while on the other hand the neck may move while the larynx and trachea keep stationary. It follows that as the tracheostomy tube is relatively fixed to the neck wound and hence to the neck skin, there must frequently be movement between the tracheostomy tube and the trachea. Any application secured to the neck or to the tube, such as for immobilization or ventilation, further supports any ability of the tube to accommodate itself to tracheal movement and contributes to even further to the tracheal movement. Dossell (1969) studying post intubation apnoea after endotracheal intubation found that when positive pressure ventilation had been given changes occurred in the cuff area even though the cuff had been deflated regularly. Within three hours there was epithelial loss followed within the next 48 hours by deep ulceration leading to exposure of pyriformiform and after 76 hours destruction of the cartilage (Table 2).

Table 2

DURATION OF PPE	FOR CHANGE
<48 hrs	SUPERFICIAL TRACHEITIS & MUCIN EXPOSURE
1-3 days	ULCERATION
1 day	EXPOSURE OF CARTILAGE
1-2 weeks	SOFTENING & FRACTURATION OF CARTILAGE
2 weeks	CARTILAGE COMPLETELY DESTROYED IN SOME SPECIMENS

Blackman, Cross & Brown (1976) making a study of the pressure exerted on a

crashes by inflatable cuffs showed that only 3 of the 17 models actually available gave an effective seal while the pressure in the cuff was below that of the tracheal opacification. However, there was histological proof of tracheal damage where a floppy inflated tube had been used and not over inflated in a Plymouth patient (Kilford 1976). In an attempt to reduce the tracheal damage cuffs have been used which are inflated only during the expiratory phase. The intermittent release of cuffs is generally recommended by ENT surgeons but not universally planned intubation generally has quite quickly occurs in any tracheotomy wound and though remarkable this may well add to the effects of trauma.

Management

The neck must be stabilised in patients with multiple or severe injuries. A severe direct injury to the cervical airway may well produce obvious dyspnoea, though not in class 2 or 4) and if the patient is conscious then there may be dysphagia. Even if there are other severe injuries a tracheostomy may be indicated for relief of obstruction and perhaps for the administration of general anaesthesia. Harris has the danger that the cross bracing used in injury to the larynx may be raised until decontamination is attempted. Opens & Baller (1971) imply that cervical emphysema in the absence of mechanical asphyxia or pneumothorax is an indication for cervical exploration. This would seem severely reasonable as in these circumstances cervical emphysema has resulted from a tear of the mucosa of the airway and even if this initially is only slight, any further restriction of the airway leading to increased respiratory effort can quickly result in rapid emphysema with great difficulty in the surgical exploration (Class 4). If feasible indirect laryngoscopy should be attempted. If successful this may reveal injury or suspicion of injury and also

indicate what laryngeal movement is possible. If unsuccessful and there is serious doubt about the state of the larynx or if it is certain there is damage, then laryngoscopy under general anaesthesia is the next step. In this connection Marx & Hall (1976) point out that when the epiglottis is depressed a laryngoscope passed behind it may lift it forwards with the result that the posterior injury is not noted. The laryngeal injuries may include fractures of the thyroid ala cartilages (a mobile ventral split is the most common), avulsion of the arytenoid cartilages from the cricoid, dislocation of the epiglottis and recurrent laryngeal nerve palsy (Fig 12). An open operation incisions can be reduced and evoked displaced pieces of cartilage removed. McGee's knife, plates or needles may be required to hold the structure in place and to prevent adhesions between raw surfaces. At a later stage granulations may need removal either independently or by tracheostomy. Granulations affecting both sides of the larynx would generally be removed from only one side in any



Fig 12. Direct evidence of severe damage in the larynx of a patient.

- A. Epiglottis severely damaged.
- B. Fracture of arytenoid cartilage.
- C. Fracture of thyroid ala cartilage.
- D. Epiglottis severely damaged.

particular operation, the superior side not being tackled until the true area has fully perforated. If chronic stenosis of the larynx has occurred the long term result is likely to be much poorer than if early operation has been carried out. In successful relief of the stenosis in this case it may be necessary to undertake horizontal or vertical partial laryngotomy to ensure an adequate airway on the upper respiratory tract.

Sub-glottic stenosis is a problem which is fraught with difficulties (Case 2). This region is on my case notes and the laryngectomy lies in a bed of lower esophageal cancer, not simply resting against the cartilage. The second cartilage is in a sense the foundation stone of the larynx — both the thyroid cartilage and the arytenoid cartilages having to rest on its attachment to the vocal cord. It articulates with it. The recurrent laryngeal nerves are at risk, running behind the crico-thyroid attachment. It was possibly here that the recurrent laryngeal nerve was damaged in case 2. Possibly the best technique for treating stenosis in the region is described by Glanville and Hayes (1974) in which the anterior arch of the cricoid cartilage is removed through the window the attachment of the crico-thyroid muscle).

Stenosis at a lower level (all of a few segments) may be managed by bronchopexy (case 7) but most cases are best managed by transection of the stenosis and direct anastomosis (case 8). The extent to which the trachea can be mobilised depends with age. Glanville (1974) describes how, in children stenosis more than 4.5 centimeters of trachea can be dissected with mechanical mobilisation, including the re-implantation of the left main bronchus, and commonly be restored by direct anastomosis without median incision. However, by simple mobilisation of the trachea many finger dissections in front of the trachea into the upper mediastinal and posteriorly between it and the oesophagus, a segment

of about 4.5 centimeters can be safely restored, particularly if the work is done post-operatively (Glanville 1974). Further length can be obtained in the neck by performing a laryngeal bag anastomosis (Glanville and Perleman, 1969) in which the thyroid cartilages are released from the larynx bone by division of the thyrohyoid muscle and the adjacent thyrohyoid membrane, carefully preserving pharyngeal constrictor muscle. This will give a further 2 centimeters or so.

The length of the stenosis resulting from the trauma is generally about 2.5 centimeters, and mobilising sufficient length to perform an end to end anastomosis is generally straightforward (Fig. 12).

The most difficult cases are those in which there is stenosis at the site of both the crura and the cuff. It is here that 4 centimeters or more may need to be restored. Various rough measures have been recommended but the principles would be to have an airway lined by respiratory epithelium and supported by cartilage (plastic or cartilage) which does not undergo fibrous healing. For some patients permanent tracheostomy with a speaking valve if possible may be the best management.

There is not as yet widespread agreement on the management of subglottal stenosis.



Fig. 12 Typical laryngotracheal stenosis in older child.

the fashioning of tracheostomies and the post-operative management of the tracheostomy. This may well be because individual surgeons often have limited experience of the practical problems. However it is suggested the following points be considered:

1. There is positive evidence that an endotracheal tube in position for 76 hours causes significant damage and except perhaps in the case of the larynx there tube is used in children a tracheostomy should be carried out at the tube in early to be needed for longer.
2. If a cuffed tube is used then the cuff should be inflated periodically (various reports are slightly different) and preferably a tube with a soft cuff should be used.
3. A tracheostomy using a vertical incision and with any incision through the wound should be considered rather than constructing a flap.
4. Heavy equipment around the neck or attached to the tracheostomy tube should be avoided.
5. The material of the tube may well be important. Silastic is less irritant and has some flexibility. Nylon is easy to clean and is light in weight.
6. Careful examination of all patients who have been intubated and kept on positive pressure respiration is essential at discharge. Circular circumferential ulceration at the site of the cuff is always followed by stricture within weeks or months. Such patients need follow-up bronchoscopy at the discretion of the medical team may be reduced to 2

inflations before there is stricture or a satisfactory result.

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References

- BEYLE, D. P. (1972) The surgical management of laryngeal tracheal injury. *Journal of Laryngology and Otology*, **82**, 547-557.
- DUFFY, D. and GREENMAN, R. H. (1976) Laryngeal edema and other lesions in intubated animals. *Annals of Surgery*, **183**, 756-774.
- EDWARDS, W. H. (1976) *Biomechanics of the respiratory system*. *Archives of Physiology*, **66**, 151-154.
- CONWAY, J. and BEYLE, D. P. (1974) The management of laryngeal tracheal lesions by tracheostomy and other techniques. *The Laryngologist*, **89**, 769-787.
- OSBORN, R. C. (1964) Circumferential reaction and ulceration of the subglottis and cervical trachea during intubation. *Annals*, **162**, 751-755.
- OSBORN, R. C. (1971) Ulceration of the trachea. *Throat*, **28**, 447-475.
- LEMPERLE, J. J. (1967) *Practical experimental tracheotomy*. *Acta Anatomologica*, **34**, Suppl. 1, 1-11.
- ROCHERONNE, P., KILGER, J. and BAZZARD, E. C. (1974) A study of subglottic cuffs in endotracheal tubes. *Anaesthesiology*, **40**, 545-550.
- WILSON, R. D. and JAIN, P. M. (1976) Some laryngeal lesions. *Larynx*, **1**, 107-110.
- OSBORN, R. C. and OSBORN, W. P. (1971) Examination of the larynx following tracheotomy. *Archives of Otolaryngology*, **94**, 441-450.
- YASUDA, A., OKADA, M., SHIMIZU, T. (1973) Tracheotomy in children. *Archives of Otolaryngology*, **98**, 156-159.
- YASUDA, A. (1975) Personal communication.
- ALLEN, R. M. (1971) *Consciousness, Air Way & Flap*. *The Davis Group*, Vol. 4, p. 2.
- HAUG, R. P. (1971) Tracheal injury not to ignore and intubation. *Anaesthesia*, **26**, 51-53.
- TURNER, A. L. (1966) Lesions of the upper airway following intubation and tracheostomy. *Journal of Laryngology, Rhinology & Otolaryngology*, **86**, 513-527.

Surgeon Probationers: The young medical students who served in the Royal Navy during the First Great War of 1914-1918.

R. S. Allen

Part III

Chapter 5

Some personal recollections

This chapter is based on personal notes made in 1945-49 and which I kept over a period of eight months during which I served as a surgeon probationer on the destroyer HMS *Acorn*, then attached to the 5th Flotilla and based at Brindisi in the Adriatic. The ship was of some 780 tons burden or displacement, with two masts, and carried an armament of two four inch guns openly mounted on the fore and quarter decks respectively, a light machine gun mounted on either side at the break of the foremast, and two torpedo tubes. In addition she carried a number of depth charges placed all over the stern, with a light crane on either side from which personnel could be launched and recovered by the ship when operating in a minefield. The distinctive features of this "B" class of destroyer were their one long and two short funnels, an open bridge, guns without shields, and ship's boats consisting of a whaler, a dinghy and a standard type of motor boat. Besides the *Acorn* had the usual complement of Cook, Flour, or Librarian. Speed at full throttle was 27 knots. She had been built in 1914-15.

I passed the second M.B. examination in June 1915 in anatomy and physiology and having undergone a medical examination reported for duty on the 11th July 1915 at

the Royal Naval Hospital, Haslem. There, to my surprise, I found that another brilliant medical student, J. S. Lyle, and myself were the only two surgeon probationers from the British Isles, although there were some 15-20 others who were Canadian, and students at McGill University and La Salle University, Montreal or from Toronto. For accommodation the whole batch were lodged in one of the upper wards of the hospital and we were permitted to make use of the wardroom in the medical mess and have our meals there in the company of the medical officers.

Being only nineteen years old and having never before been away from home apart from brief holidays, and being educated at a day school, it was a novel experience to find oneself sleeping in a dormitory at night with so many strangers. Not only was their accent and phonology different but the French-Canadians among them on all occasions when talking together broke into French and had greater fluency of speech in that language. They were two or three years older than us, many of us their behaviour and already had some experience of hospital. Certainly compared with myself, J. S. Lyle and W. A. Dick, also from Britain, who was shortly to join us at Haslem, the Canadian surgeon probationers seemed to possess infinitely more worldliness and know how than we did and we never found any difficulty in making friends with them.

Haslem was a good nursing ground and I noted that it used to absorb 50 cases of well

ANNUAL REPORT OF THE
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By

J. B. HARRIS, Director, Bureau of
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Fishes, U. S. Department of Commerce, Washington, D. C.

ANNUAL REPORT OF THE
COMMISSIONER OF THE BUREAU OF
FISHES, 1901

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Approved as Journal of the Bureau of
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WATER RESOURCES, 1964 - 1965

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1966	1.1	1.1	1.1
1967	1.1	1.1	1.1
1968	1.1	1.1	1.1
1969	1.1	1.1	1.1
1970	1.1	1.1	1.1
1971	1.1	1.1	1.1
1972	1.1	1.1	1.1
1973	1.1	1.1	1.1
1974	1.1	1.1	1.1
1975	1.1	1.1	1.1
1976	1.1	1.1	1.1
1977	1.1	1.1	1.1
1978	1.1	1.1	1.1
1979	1.1	1.1	1.1
1980	1.1	1.1	1.1
1981	1.1	1.1	1.1
1982	1.1	1.1	1.1
1983	1.1	1.1	1.1
1984	1.1	1.1	1.1
1985	1.1	1.1	1.1
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1987	1.1	1.1	1.1
1988	1.1	1.1	1.1
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1990	1.1	1.1	1.1
1991	1.1	1.1	1.1
1992	1.1	1.1	1.1
1993	1.1	1.1	1.1
1994	1.1	1.1	1.1
1995	1.1	1.1	1.1
1996	1.1	1.1	1.1
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2007	1.1	1.1	1.1
2008	1.1	1.1	1.1
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2010	1.1	1.1	1.1
2011	1.1	1.1	1.1
2012	1.1	1.1	1.1
2013	1.1	1.1	1.1
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2016	1.1	1.1	1.1
2017	1.1	1.1	1.1
2018	1.1	1.1	1.1
2019	1.1	1.1	1.1
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2021	1.1	1.1	1.1
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2025	1.1	1.1	1.1
2026	1.1	1.1	1.1
2027	1.1	1.1	1.1
2028	1.1	1.1	1.1
2029	1.1	1.1	1.1
2030	1.1	1.1	1.1
2031	1.1	1.1	1.1
2032	1.1	1.1	1.1
2033	1.1	1.1	1.1
2034	1.1	1.1	1.1
2035	1.1	1.1	1.1
2036	1.1	1.1	1.1
2037	1.1	1.1	1.1
2038	1.1	1.1	1.1
2039	1.1	1.1	1.1
2040	1.1	1.1	1.1
2041	1.1	1.1	1.1
2042	1.1	1.1	1.1
2043	1.1	1.1	1.1
2044	1.1	1.1	1.1
2045	1.1	1.1	1.1
2046	1.1	1.1	1.1
2047	1.1	1.1	1.1
2048	1.1	1.1	1.1
2049	1.1	1.1	1.1
2050	1.1	1.1	1.1
2051	1.1	1.1	1.1
2052	1.1	1.1	1.1
2053	1.1	1.1	1.1
2054	1.1	1.1	1.1
2055	1.1	1.1	1.1
2056	1.1	1.1	1.1
2057	1.1	1.1	1.1
2058	1.1	1.1	1.1
2059	1.1	1.1	1.1
2060	1.1	1.1	1.1
2061	1.1	1.1	1.1
2062	1.1	1.1	1.1
2063	1.1	1.1	1.1
2064	1.1	1.1	1.1
2065	1.1	1.1	1.1
2066	1.1	1.1	1.1
2067	1.1	1.1	1.1
2068	1.1	1.1	1.1
2069	1.1	1.1	1.1
2070	1.1	1.1	1.1
2071	1.1	1.1	1.1
2072	1.1	1.1	1.1
2073	1.1	1.1	1.1
2074	1.1	1.1	1.1
2075	1.1	1.1	1.1
2076	1.1	1.1	1.1
2077	1.1	1.1	1.1
2078	1.1	1.1	1.1
2079	1.1	1.1	1.1
2080	1.1	1.1	1.1
2081	1.1	1.1	1.1
2082	1.1	1.1	1.1
2083	1.1	1.1	1.1
2084	1.1	1.1	1.1
2085	1.1	1.1	1.1
2086	1.1	1.1	1.1
2087	1.1	1.1	1.1
2088	1.1	1.1	1.1
2089	1.1	1.1	1.1
2090	1.1	1.1	1.1
2091	1.1	1.1	1.1
2092	1.1	1.1	1.1
2093	1.1	1.1	1.1
2094	1.1	1.1	1.1
2095	1.1	1.1	1.1
2096	1.1	1.1	1.1
2097	1.1	1.1	1.1
2098	1.1	1.1	1.1
2099	1.1	1.1	1.1
2100	1.1	1.1	1.1

† Some low flow years listed in brackets.
 Records for high water listed in the wet
 and dry seasons.

<u>Name</u>	<u>Year of Enrollment</u>	<u>Appointed to</u>
Robert Langhorne Leasing Ward	April	1881 AGENT
Thos. F. Johnson	April	1881 AGENT
George William Mitchell, Minister	April	1881 TOWN
John Morris Napack	April	1881 AGENT
George Leamon Niles	April	1881 LAMAR
Joseph Peter Fleming	April	1881 TOWN
James Nathan Niles	April	1881 LAMAR
William John Lonsdale	May	
John Joseph O'Neil	May	1881 TOWN
George Edward Speer	May	1881 TOWN
John Richard Stone	May	1881 LAMAR
Reuben Stone Jones	May	1881 AGENT
Edwin Woodford Taylor	June	
John Langley Nichols	June	1881 AGENT
John Bruce Bryant Wilford	June	1881 AGENT
Edwin William Hall	June	1881 WILLIAMS
John James Haggard	June	1881 AGENT
J. Thomas Harkness	June	1881 AGENT
George Lawrence Hickok	June	1881 TOWN
George Stanley O'Brien	June	1881 AGENT
Frederick Thompson	June	1881 AGENT
Philo Taylor	June	1881 AGENT
Edwin Jones	June	1881 LAMAR
Edwin Davidson	June	1881 TOWN
James Philip Crawford	June	1881 TOWN
John John Lewis	June	1881 AGENT
Edward Henry Steele Smith	July	1881 TOWN
Edward Stanley Wade	July	1881 AGENT
James Murray Thompson	July	1881 AGENT
Thomas Davis	July	1881 TOWN
David Smith	July	1881 AGENT
John William Stewart	July	1881 AGENT
John Herbert Hartman	July	1881 WILLIAMS
Alexander Lee	July	1881 AGENT
W. Howard O'Connell, Minister	July	1881 AGENT
David Anderson	July	1881 LAMAR
Charles Carlisle Craig	July	1881 TOWN
Alexander Miller	July	1881 AGENT
Henry Hart	July	1881 AGENT
George John	July	1881 TOWN
TV Miller	July	1881 AGENT
George Harrison	July	1881 AGENT
David Douglas Matthews	July	1881 AGENT
Harold Harrison	July	1881 AGENT
William Andrew Jones	August	1881 LAMAR
James John Haggard	August	1881 TOWN
Alexander Matthews	August	1881 TOWN
Frank John Harrison	August	1881 AGENT
David Leamon Brown	August	1881 LAMAR
James Edwin Fleming, Minister	August	1881 AGENT
Frederick Lee John Fleming	August	1881 AGENT
John Wilson	September	1881 AGENT
James Alexander Taylor	September	1881 AGENT
Isaac Francis Bennett, Minister	September	1881 AGENT

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[illegible][illegible]

[illegible]

[illegible]

Name	Date of Immigration	Applicant's Reference
John Douglas Thompson	August	1881 18410141
William Andrew Smith	August	1881 18410141
Thomas J. Brennan	August	1882 18410141
William McClellan	August	1882 18410141
William Thompson	August	1882 18410141
Richard Henry Manning	August	1882 18410141
Thomas Arthur Dean Bennett	August	1882 18410141
Thomas Dean Bennett	August	1882 18410141
James Bennett	August	1882 18410141
Charles William Jr. William Thompson	August	1882 18410141
Alexander Lee Lee	August	1882 18410141
Alfred Campbell Jones	August	1882 18410141
William Arthur Jones	August	1882 18410141
Richard Henry Jones	August	1882 18410141
James Lee William Thompson	August	1882 18410141
James Henry Jones	August	1882 18410141
Thomas Thompson	August	1882 18410141
Thomas William Thompson	August	1882 18410141
George Alexander Jones	August	1882 18410141
E. Hugh Thompson	August	1882 18410141
James Jones	August	1882 18410141
Thomas Thompson Jones	August	1882 18410141
Thomas William Thompson	August	1882 18410141

the labelling of tracheostomies and the post-operative management of the tracheostomy. This may well be because individual concepts often have limited experience of the training problems. However it is suggested the following points be considered:

1. There is positive evidence that an endotracheal tube in position for 24 hours causes significant damage and thought perhaps in the case of the Jackson Rees tube at least in children, a tracheostomy should be carried out if the tube is likely to be needed for longer.
2. If auffed tube is used then the cuff should be released periodically (certain regimens are suggested) and preferably a tube with a soft cuff should be used.
3. A tracheostomy using a ventral incision and with stay sutures through the wound should be considered rather than constructing a flap.
4. Heavy equipment around the neck or attached to the tracheostomy tube should be avoided.
5. The material of the tube may well be important. Silicone is less irritant and has some flexibility. Nylon is very clean and is light in weight.
6. Careful examination of all patients who have been intubated and kept on positive pressure respiration is essential at extubation. Careful circumferential observation of the site of the cuff is always followed by straight white marks or marks. Such patients need follow-up bronchoscopy as the consequent tracheal lesion may be reduced to 2

millimetres before there is stridor in a sedentary patient.

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References

- BRUCE D. P. (1972) The clinical management of foreign bodies: many aspects of laryngology and otology. *Br. J. Otol.* **28**, 227-242.
- STEIN R. S. and FRANKLIN W. B. (1961) Laryngeal edema and other sequelae for tracheal intubation. *Anaesthesiology*, **34**, 395-396.
- DOUGLASS W. M. (1956) Pathology of endotracheal intubation. *Archives of Pathology*, **64**, 111-122.
- BARRETT J. and BRUCE D. P. (1974) The management of subglottic laryngeal stenosis by tracheal and chest dissection. *The Laryngoscope*, **84**, 790-797.
- CHAMBERLAIN J. (1964) A circumferential stenosis and its management in the post-tracheal and endotracheal. *Journal of Laryngology*, **74**, 77-104.
- CHAMBERLAIN J. C. (1975) Reintubation of the trachea. *Throat*, **34**, 167-174.
- LEPOTOWSKI J. E. (1958) Laryngeal endotracheal intubation. *Acta Anaesthesiologica Scandinavica*, **Supplement 13**.
- MALIKOWSKI P., BLUM S. A. and BRUCE D. P. (1974) A study of subglottic striae in endotracheal tubes. *British Journal of Anaesthesia*, **50**, 529-538.
- MARSH W. R. D. and JONES P. M. (1970) Acute tracheobronchitis. *Lancet*, **i**, 1107-1110.
- SCULLIN M. G. and JONES W. E. (1973) Reintubation of the larynx following fibre intubation. *Journal of Laryngology*, **83**, 551-558.
- PARVA A. and JONES W. E. (1975) A study of the technique of intubation. *Journal of Laryngology*, **85**, 120-127.
- LEPOTOWSKI J. E. (1974) Personal communication.
- ROSE R. B. (1971) *Textbook of Diseases of the Nose and Throat*. 2nd. 2nd. edn. London: Vol. 1, 310-311.
- LEWIS R. F. (1971) Tracheal injury in the larynx and trachea. *Anaesthesia*, **26**, 31-33.
- CLAPHAM A. L. (1974) Section of the larynx in children following intubation and tracheostomy. *Journal of Laryngology & Otology*, **94**, 315-324.

Surgeon Probationers: The young medical students who served in the Royal Navy during the First Great War of 1914-1918.

R. S. Allison

Part III

Chapter 5

Some personal recollections

This chapter is based on personal notes made in 1918-19 and which I kept over a period of eight months during which I served as a surgeon probationer in the destroyer *HMVS Arona*, then attached to the 5th Flotilla and based at Rosyth on the Atlantic. The ship was of some 750 tons, fitted out almost with two masts, and carried an armament of two four-inch guns openly mounted on the fore and quarter decks respectively, a light twelve-pounder placed on either side in the bow of the foremast, and two eight-inch tubes. In addition she carried a number of depth charges placed all over the stern with a light crane on either side from which personnel could be launched and recovered behind the ship when operating as a minefield. The distinctive features of this 'W' class of destroyer were three masts, a long and two short funnels, an open bridge, guns without shields, and depth boats consisting of a whale, a dingy and a standard type of motor boat. Besides this *Arona* had the usual complement of Corby Boats or Motor Launches. Speed in full throttle was 27 knots. She had been built in 1912 (1).

I passed the second M.B. examination in June 1916 on anatomy and physiology and, having undergone a medical examination, reported for duty on the 21st July, 1916 at

the Royal Naval Hospital, Haslar. There in my outpatient I found that another Belfast medical student, J. S. Lyle, and myself were the only two surgeon probationers from the British Isles, although there were some 15-20 others who were Canadian, and students at McGill University and La Salle University, Montreal, or from Toronto; the accommodation for the whole batch were lodged in one of the upper wards of the hospital and we were permitted to make use of the wardroom as the medical mess and have our meals there in the company of the medical officers.

Being only nineteen years old and having never before been away from home apart from hotel holidays, and being attached to a day school, it was a novel experience to find myself sleeping in a dormitory at night with so many strangers. Not only was there accent and physiology difficult but the French-Canadians among them would often when talking together break into French and had greater fluency of speech in that language. They were two or three years older than us, were away at their behaviour and already had some experience of hospital. Certainly compared with myself, J. S. Lyle and W. A. Beck, also from Belfast who was shortly to join us at Haslar, the Canadian surgeon probationers seemed to possess infinitely more worldliness and know how than we did and we never found any difficulty in making friends with them.

Haslar was a good training ground and I noted that it stood in about 60 acres of well

high grounds and on the sea front overlooking Spithead and had long young corridors with paved drains on the ground floor.

At dinner in the mess the president sitting at the top of the long table and the vice president (a junior member of the mess) at the lower end circles the table with his mouth to call the officers to attention and raising his glass looks down the table and announces simply 'Ich Trank' (whereupon the vice-president echoes, 'Gentlemen The King, and the assembled company raising their glasses honour the Tsar, all remaining silent') whilst the various in the Army who all stand up.

On the 4th August is the vote. We have decided to apply for service in the Mediterranean. Meanwhile our meetings are given over to work in the medical wards under the direction of a surgeon named Portman (a very nice fellow who plays the piano well). On the 11th August we spent the whole morning in the Victoria Dismal Ward and saw as much clinical evidence of syphilis and gonorrhoea as it was possible to include in the morning.

There was certainly no dearth of material: large gonorrhoeal tumours crusting the bones of the pelvis and protruding on the surface of the scalp as fleshy open sores, similar where on the legs, and a patient with a bulging leucorrhoeal empysem which had partly eroded his diaphragm. On another morning when light and I went to the Nervous Diseases Block I saw my first case of pares (general paralysis of the insane) as well as a number of purely nervous or mental patients some of them obvious misbegotten, of which one especially remained in my memory. This was a young sailor with an hysterical or hysterical contraction of the muscles of his back. His ship had been blown up and sunk by a mine

and the man had developed as a result a permanent stooping or bent position and he came under the care of Dr Richard Cuffill² then a Staff Surgeon. RM. We watched his treatment with amazement. Convinced the patient to a Paradise history of the roller type, he told him to expect the treatment to be painful but that it would certainly cure him, and he then proceeded to expose the patient's back and run the Finster battery up and down the surface of the skin close to the spinal column so that the patient constantly responded by exclaiming 'gods of the medicine of his back'. Before the session had terminated he was able to stand uprightly in the erect posture and move his back fairly despite his promise that such movements would pain. The first stage of his recovery had been successfully completed and Cuffill predicted that very soon he would be fit for duty again.

On another morning a First Surgeon gave us instruction in the Messy on nasal cauterisation and cautery, and on the 14th August we were taken around on a visit to HMS Messy which then in 1918 was still official and moored in Portsmouth Harbour. I noted then — the main mast of the ship is 140 feet tall and it has five decks. Stowed under the poop is the ship's cage or light open boat which had conveyed Admiral Nelson's coffin from the Thames to St. Peter's. We were shown one the exact spot on the quarterdeck where the Admiral had been shot down by the bullet fired by a French cannon from the rigging of the *Redoubtable*.

Having gained a general impression of the hospital and the work, I graduated to the operating theatre block where I spent three mornings watching operations and receiving instruction in anaesthetics from one of the senior surgeons of whom 'Floss'

¹Victor Gifford the nurse had been established in the equivalent capacity of the Navy, including stated during the building of the Royal Naval Hospital of the South of Scotland (which stands in the old workhouse).

²Dr Richard Cuffill was a physician in the staff of the Portsmouth Hospital and a consultant and colleague of the famous Percy Thomas, who became famous for his clinical work. *Biography of Percy Thomas* is what Cuffill contributed many illustrations. Cuffill was an excellent teacher.

Surgeon Morris was one of the dooziest (and most experienced) brains I have. The method as per was the rig and bottle with chloroform and ether. Apparently many of the privates suffered had little experience of even this primitive form of anaesthesia for an anaesthetist when a fairly red blood stoker was placed on the table to turn on operations for the case of an escaped horse and the nursing association commenced dropping ether on to a piece muslin held over the man's face. He wrongly assumed that the anaesthetist was having effect and told the surgeon he would commence the operation. But as soon as the latter took up a scalpel and touched the man's skin with its cutting edge, he promptly jumped up on the table and throwing off the preparatory stupe showed the man with a choice series of words and impressions whilst he struggled with six teeth assistants and surgeon professionals holding him down by force. Indeed it took seven or more tons of prolonged subduers by chloroform to bring about the necessary degree of anaesthesia and muscular relaxation so that the operation could proceed.

Life at Hinder although it lasted only a few weeks was never dull. We could sample the drinks available in the mess (I mean not those leave into Portsmouth was granted on most occasions). I remember that an Admiralty Fleet Order (A.F.O.) appeared in the mess hall dealing with the behaviour of officers stationed in shore establishments pointing out that shore leave should not be permitted until 1400. Officers were to be properly dressed, to carry kit gloves and a regulation cane. Pipe or cigarette smoking was not approved in the wards. In these days one had the closure of the regular public bar, which was from Gosport to Portsmouth in the day packet boat, which most of us preferred - which left the hospital from the end of the petty building down to the waterfront from the mess gate and which was lined by trees had had increasing loss of into the concrete surface

so that patients could be conveyed from boats direct by a horse drawn railway under the hospital. The main gateway across the harbour entrance was paid to security. Fleet Surgeons Staff Surgeons and other senior officers entered the boat after all lower ranks, i.e. S.B.A.s, nurses, V.A.D.s and surgical professionals, were already seated in the boat.

One afternoon, when with Billy Black, I took a walk over to Lee wharf. It was inspiring to see the young pilots of the unemployed Fleet Air Arm taking up their aircraft either monoplane or biplane with accommodation for two persons at most. I remember one night that dark morning in Hinder in flat planes and flying past the landing and taking off, although the only thing one noticed was the continuous stream of stripes and the gleam of the aircraft's navigation lights in the gloom as they hurried across the runway not more than fifty feet above our heads.

At night in our big dormitory wards sitting on our beds we would have long talks. The company was good and we made many new friends. There were plenty of good natured officers and animated discussions making comparisons between Canada and Great Britain, inevitably to the latter's disadvantage. The Canadians pointed out that Great Britain compared to Canada as one was "no more than a pocket handkerchief". You could put the United Kingdom easily into the Great Lakes. Our company was a silly system with outbursts half parties, games, thrashings, law, disputes and challenges compared with the Canada's dinner with one hundred or so of them. Josephine was particularly disgusting but he was a good fellow entertaining and together with a student from McGill University named Bill Black I enjoyed taking walks. Bill Black was not so verbally aggressive and was a much more tolerant type - a kind fellow who unfortunately lost his life some months later when he was appointed to a ship on the

McGillivray, RMM Surgeon. "What was around? Another Canadian with whom I became very friendly was a Roman Catholic called James, from La Belle, an insurance fellow who used to escort his numerous adventures in Panama to our delight in the dormitory at nights and displayed triumphantly brassieres, garters and other feminine articles of female underwear which he had captured. I was not so fortunate a recipient of garments myself. One early in August I was invited to play tennis at Staff Sergeant Ted Miles' (Crested) in the terrace and back was a most attractive girl of about my own age who was a W.R.N. engaged in serving sexual entertainers at Fort Woodhouse.

Circumstances were moving and on the 10th August 2.3.45 Light was given two hours notice in repair on board SS Knight Transport which was sailing shortly for America. However, he arrived back in Harlow next day having missed his ship and meanwhile no word had come for me about a ship. On August 21st I received my monthly pay amounting to £18 and made the note "Was it really the first time I have had to deal with a large quantity of money. This morning at the opportunity through I giving 10th (suspense) on due of the month I met a sailor from HMS Sheildrake which is a destroyer on the coast from St. Anne's. He says the ship is at Harlow."

And then at long last, on 2nd September I received orders to join RMM Army in the Mediterranean making the journey overseas via Cherbourg, Tientsin and Malta. There was time to get some last minute shopping which I bought served home from Goldsmen's on Parkmans in Ward Or where sister Selma who is cap owner and two sons of who is still.

Arrived with a yellow warrant when I left Harlow on Sunday 9th September. I returned for Southampton and was fortunate in meeting a Private Gilmore who was going to the same draft and was bound

for Malta. At Southampton Dock a big American Transport was just docking not far away from our ship, the Cassius, formerly a Channel Island ferry. Hundreds of Americans were disembarking, all of them possessing a novel sight in their freshly issued uniforms of khaki, their socks knitted up to their shin, their legs encased in puttees or leggings, and on their heads, big scout types of hat or glass of the usual caps worn by British troops. They had just arrived from America and were in high spirits and anxious to get to grips with the enemy and coming after four years of war was a welcome relief. Another welcome sight coming on board the Cassius was Bill McCutcheon, a fellow student from my year at Queen's and now a surgeon practitioner. He had not been to Harlow nor had he had any preliminary training but had come direct from his home in Canterbury. Like most of the officers and men proceeding on draft to the Mediterranean I was violently sick that first night crossing the Channel to Cherbourg, which we reached the following morning before breakfast. There the six or seven hundred ratings draft was put in trucks and taken to a vast camp on the outskirts of the town and, as officers, we were permitted to make our own way thence. Delighted to the prospect of finding myself abroad for the first time I went into a cafe and asked the smart young waiters there for breakfast or early lunch. There was help on the menu so I said, "Madame, could you give me a glass of mineral water, please?" whereupon the young waitress eyed me with a smile and quipped "Mineral water de poisson?" When I repeated the request she turned to the other men in the restaurant who were eating there and announced, "Ce monsieur demande du poisson." Whereupon there were smiles all round and I realised my pronunciation was at fault, he quickly correcting it to "du poisson" the order was immediately complied with. A good breakfast or lunch with coffee and so

led 20 each and from a shop nearby I purchased a bottle of Vin Ordinaire to fortify myself for the journey.

It rained heavily all that day which we spent at the rest camp. McCurtain and I spending that afternoon reviewing mail. Early the next morning we embarked on the troop train, which was in company on all the way to Turin and to stay over night days in no doing. Like the other officers on the desk we were assigned to coaches, four in each compartment so that we slept one on each side and two on the floor. The ratings were accommodated in a long line of standard cattle stalls and the train was ready to fly a mile long. On our journey we passed through the town of Cass. Town Sergeant Percy Le Mansel, St. Germain de Mont D'Or, until we came to Lyons. The train proceeded at slow speed and we passed through the town of Cass on an elevated track which went over the streets. The soldiers causing great amusement to the townspeople by running up and down on the roofs of their coaches or hanging their legs over the side and waving to them. Inevitably there were numerous delays when the train was forced into villages to permit other traffic to get by. The officer in command was hard put to it to control the behavior of the troops for at times as the train stopped in the French countryside even for ten minutes the soldiers were getting out of the trucks and striding into the fields bordering the line in which groups were growing. Then, as the engine gave a shrill whistle to announce that we were getting under way again there was a great rush for the train, the men clattering on board as it began to move. Just outside Percy Le Mansel one of them, a young sergeant, had a fall badly caused by the wheel of the train passing over it and there was some delay whilst at the station an ambulance was summoned and he was taken to the local hospital. The advantage of these infrequent falls is obvious as you see that we could have died from the incident.

Thus at Percy Le Mansel we had an ambulance sent out to bed the six French and two delicious post-horse for a few coins.

At Turin I struck up an acquaintance with two young French military officers who were on their way to the front. One of them, a cadet, was from St. Ger. At 5 p.m. on the third evening we arrived at a village where there was a rest camp, in which we passed the night. This was St. Germain de Mont D'Or which lay about two or three miles from the Rhine in a perfect corner of countryside, the village itself having very narrow cobbled streets surrounding a square in which there was a big drinking trough and which appeared to be used by the village-women washing their clothes. At 7 a.m. the village was practically deserted and except for a mob crowding at a dog barking in the distance there was complete silence. Breakfast was served at the rest camp shortly afterwards and after a short journey running parallel to the river we rambled into the great station at Lyons. From thence on we passed through magnificent country of extensive prairie and many long forests. Two villages in view — St. Raphael on Saône and Tourn particularly took my fancy. Then we passed along the shores of Le Lac de Bourges and Joux-la-Faune was reached. There on the station platform, stood a young Marse in Civil in his black dress and showed his smiling benevolently and waving his stick as so as the train went by. We were passing through the Jussy Alps by then, and had a clear view of Le Chablais à travers France, which was indeed a bright month (2). And as we ate the Mont Cenis tunnel.

The next day McCurtain and I woke after it had been our turn to occupy the outboard seats in the compartment in front ourselves covered by rubber sheet and blanket which caused big people on our heads and feet and indeed over all exposed parts. Another officer travelling with us in the compartment recognized they were bad big hats and advising us to pull out the

embark we encountered some fairly stiff lip of the currents which tried to take over from the light. I well remember the rocky stretch there was as we squandered them and the crack as their shells burst. The Lieutenant R N R, with an interest as to ensure ourselves that morning by getting them to ease each other as an improved track on the average floor used we gave trial of the sport.

The town was now running through Northern Italy which was not so different from Southern France except that in place of vineyards and wheat we saw mostly broken corn or maize in the fields. We passed through Turin and Aosta, Alessandria, Bologna, Ravenna and the town was running along the shore of the Adriatic.

Early on the next day, whilst it was still dark and our men were standing in a column, it being my turn to occupy one of the seats. I was somewhat near the handle of a walking stick through the half open window of the carriage and try to hold a pair of binoculars off the luggage rack, which for them tried to stare through the window. The stick was instantly withdrawn when I gave a shout that on opening the carriage door and looking along the platform there was no trace of the intruder.

We stopped for a third time at the next camp at Ferrara which was very well regulated. Baited and a proper meal being provided for all hands. Before and after lunch an orchestra played music from the grand opera. The journey along the Adriatic was very long, vegetables being scarce and sheep were predominating in the landscape. At ten o'clock in the morning we stopped at Comacina and had a bath in all the sandy beach which was most refreshing. Other places we passed through before coming to our destination at Trieste were Poggia and then by ship the only place life was more varied, quickly past and by noon, the sun having a playful up appearance and leaving no guess whatever the ship still remaining

cloudless.

On arrival at Trieste on the eighth day we changed into white and were lodged in a large camp of Nerves, beds where I remained for nearly a week in silence, reporting to the naval transport officer each day about the possibility of a ship going to Malta and the rest of the time spent juggling with other naval officers on passage. One of these was a hydrophone expert who entertained us by reproducing on his notes the different sounds and rhythms made by ships, engines transmitted under water — the sound of a tramp steamer's single screw driven by a steam reciprocating engine, the sound of Diesel motors as from a submarine, the note produced by a destroyer's engines running at full speed and that of a cruiser. This officer had made a very thorough study of the subject and could present almost amazing powers of interpretation of the different sounds.

McCurran went on his way a few days later to take passage for Malta and join his ship *HMCS Pendergast*. Another Quoniam in my past, surgeon professor T. H. Crockett, passed the camp shortly afterwards, the two of us spending our few last days together watching the Italian Fleet moving in and out of the locks guarding the main harbour and sending them to exercise in the basin of the harbours and racing the Naval Officers' Club which was a lively backing back of men, with great prizes and that level logic, where we could neither see coded disks of signals and take little doses of Italian as men flavoured with meat but quite different from their British counterparts because there had both the consistency and colour of water. In the course of the rest camp there was an earlier view of shore and on the last morning, somewhat late although I seemed to spend hours standing under them they had no effect in making me feel cooler, which was not surprising as the surface temperature under the cloudless sky was

without less than 180°F

Chapter 4

I can remember the tremendous feeling of elation that gripped me on 11th September when at last, having travelled by train to Brindisi and arriving in the evening, I found the port in a state of blackout on account of air raids and I boarded the duty packet boat and was conveyed across the harbour to RMS Ajax, which lay there with two other destroyers at anchor. She was due to proceed to sea on paired the next morning at 05.00. Morning, the accommodation ladder, raising the quarter deck and the aft deck of the ship, I still headed with Lieutenant R N F N named Giles. I was ordered down the companion way into the wardroom. There, in spite of the blackout which on the day, it was not unpleasantly hot — an electric fan attached to the deckhead ceiling came in rotation of air. I was presented to the captain — Commander I N Brown Mackenzie RN and the First Lieutenant Donald Ross RN — a young man of about forty, and another sub lieutenant RN called Wilkinson, who was shortly to be relieved, the fourth gunner Mr Perry and several engine room officers. Mr Killick, shortly afterwards the captain and first lieutenant went ashore, Giles remaining as duty officer, and he drummed up the party so that soon I was joined with a tankard of beer and a plate of sandwiches. Giles explained that no cabin was available for me and that, like my predecessors, I should have the choice of sleeping on the deck or the alleyway of sleeping in the wardroom. An ordinary seaman named Chapman had been detailed to look after my bedding and clothes, which were stored in drawers beneath the tables which occupied the sides of the compartment. For washing and shaving I would have to rely on the other officers a courtesy bath Mr Perry made me

there would be no difficulty and that I could even arrange to use the no bath once or twice a week like the other officers.

The next morning I was up at 7 o'clock and standing on deck towards the aft deck canopy surrounding the wardroom hatch. I watched the ship in company with three other destroyers — *Godolphin*, *Aster* and *Camden*, proceeding to sea on patrol past a number of Italian warships, part of the crew being down up on the bridge, as is customary on entering and leaving harbour. The lower page of the mast as we passed the foreign warships, and the tables were dipped. The patrol took us between the Italian coast at Brindisi, across the Adriatic to the enemy occupied Dubrovnik Coast, our course being interrupted at intervals to take on a supply pattern and our speed being 12-15 knots. In addition to periodic searches we stopped, the ship being ordered to deck with the engines and all weapons set off in order that the hydrophone whips on the bridge could listen in for any submarine sounds and especially the noise given out by a submarine's diesel engines. By day we severely rationed these papers except when there was a hurry and the ship rolled considerably, but at night I used to wake and listen to the gurgling of water in the bilges and the cone silence that prevailed for the few minutes before the regular beat of the engines was resumed and we proceeded on our allotted patrol. Incidentally I found it of great help at night to wear my half-rolled Green's waistcoat because it gave support and prevented a sudden, unexpected roll throwing me to the deck.

The other officers, who were not in watchkeeping (day) had cabins of their own but the captain who, of course, was not a regular watchkeeper and slept where he was, in the wardroom. He or forward to the charthouse under the bridge used to read the wardroom at night and if I happened to be awake would sit up and read

for a moment and pulling my about the way life I had and having to keep watch at night like the others. Donald likes the Fleet lieutenant was an efficient officer and kept a firm hand on the ship's company but he could be most amiable and amiable to many, especially at breakfast when he would complain that his fish biscuits and cereal like a spoiled child, shouting and throwing the Marmite biscuits because his egg was not fried to his taste but his liking. Perry and the engineer officer took their meals in silence and used little. Among the ship's company I liked best the quartermaster and senior was recommended being a leading seaman called Tower. He taught me the ropes, taking me all over the ship and explaining the different duties in the stateroom, kitchen and petty officers. He also demonstrated me with the ritual of anti-verruca disease prevention and the positioning of first aid bags about the ship, on deck, inside the gun and torpedo tubes, in the engine room, and on the bridge.

The prophylaxis in war in 1918 against venereal disease was known as "douching" and consisted of tubes of mercury solution for inserting into the glans penis preparatory to sexual intercourse and urine tubes containing an antiseptic, the contents of which were to be squirted into the urethra after coitus. Every sailor going ashore was expected to approach the quartermaster and arm himself with such as was he constructed a dose of uridine or penicillin. Failure to report or contracting the disease had a fine imposed by punishment by having his trousers stopped or more drastic measures. In point of fact, however important it was to take such precautions against infection, the ships then presented were more or less useless in meeting venereal disease which was not brought under control until the issue of rubber condoms became obligatory on all ships, these being obtained on demand and without charge.

We made two more ports between the 18th September and the 20th of the month then following the same route and except that we encountered bad weather on the second patrol, were without event. However, the officers and crew were kept on the alert notwithstanding because in already mentioned earlier in that same year, 1918, the American had suddenly launched an attack on the foreign one night when they had with a number of destroyers by gunfire damaging the destroyer *AWD Moore* and sinking *AWD Phoenix* outright. During the action the torpedo production of the latter was killed.

When our ship was out on actual patrol we occurred at the "net" alongside where destroyers of the *Florida* class on either side and we was free to go ashore and visit the town and its surroundings. I remember on one occasion, taking a walk with the surgeon practitioner of Gibraltar whom some was, Beartlock, going through some vineyards adjoining the harbour area, when we ran head of the paper which were growing in the ground and which only later we discovered were covered with human excreta. In fact there was a Fleet Order posted on the ship on the board warning all naval personnel against eating grapes because of the danger of dowsing.

But to return to the ship, my medicine chest a bulky object had been stored in the stateroom battery room which was a small compartment about 4 feet x 3 feet and which Tower suggested could be converted for use into a sick bay. This sounded reasonable but when I approached the First Lieutenant he wanted the idea, saying that the space was valuable and could not be spared for such a purpose. However, in the ensuing month I persuaded with my request and finally I gained the captain's permission to have the space turned into a sick bay. When I could stand every morning at 9 o'clock and at 15. 20 minutes evening for any sick things to turn up. There was too little room to accommodate

two people simultaneously, but the ceiling would place a foot on the ceiling of the compartment and speak to us through the open door. The statement provided me with a window of watching officers' behaviour in which a lot of the cases and their symptoms could be kept.

Around the 25th September when I had been a little more than a week in the ship, the fever was exacerbated by the influenza epidemic which was sweeping Europe at the time and taking a heavy toll of life in the principal cities such as Rome, Paris and London. On board *Albatross* as in many other ships, the epidemic struck suddenly. One day when we were at sea on patrol I received a message from the bridge that the captain was feeling unwell and that the duty surgeon also felt ill and was complaining of pain on breathing and vertiginous sensations. I found the latter with a high temperature. There were no physical signs but I put him off duty and advised him to turn on to his hammock. Within the next three hours six more men and sixteen were affected in the same way and I advised the captain that we would be wise to return to port and break off the patrol. That evening a dozen more of the crew were similarly taken ill and confined to their hammocks and I spoke a signal to the F.B.O. in HMS *Albatross*, our depot ship for assistance. By the next morning Sub-Lieutenant Gale, R.N.V.R. and myself were the only officers still fit for duty and of the crew there were insufficient hands to work the ship: only three R.N.A. crew members and two officers remained well. The remainder all had a fever and were confined to their hammocks. I spent that day crawling around the ship tending these hammocks, and giving them such no-garum as I have a powder as a hot drink. That afternoon a Surgeon Lieutenant and an R.N.A. from the *Albatross* came on board and advised that there was an epidemic of influenza and recommended me to

purchase a displacement mixture: a large gallon of which was brought on board by the S.B.A. for doing out to the side. The following morning all the affected officers and men were taken ashore to hospital: the most seriously ill being placed in cots, or First Lieutenant's quarters and treated over the side into a lighter by means of a block and tackle. By that time five of the patients were deceased, their breathing was stopped and they appeared to be suffering from pneumonia: two of these subsequently dying in hospital. The ship was then disinfected, sulphur candles being burned on the decks and in the wardroom and staterooms: we the few unaffected by influenza making out the best we could.

It was now approaching the end of the month and we learned that on the 3rd October the reinforced British and Italian fleets at Brindisi together with the Air Force, were to mount an attack on the enemy held Albanian coast at the fortified town of Corrinia. For this purpose the ship's company of HMS *Proserpine*, another destroyer of the same class, which had not been affected by the influenza, was put on board *Albatross* together with the few unaffected members of the original ship's company were Gale, the sub-lieutenant welcomed the chance of action. He had already taught at *Chatham* and pointed out that I should consider myself lucky because there were still many officers serving on the Navy after four years of war who had "never even heard a gun fired in anger. How true that was I did not know but I spent the night before the attack in the wardroom with the other officers of the *Proserpine* practising the usual nocturnes and bandaging. My shipmates readily volunteered themselves as militia. Next morning I awoke early shortly after six o'clock to find a party of strops in the wardroom. They had killed the two months' cows in the dock and were posing up four inch and twelve pounder machine guns from the magazines for use at the port. Later that

morning, as we prepared for sea. I took over the women's messdeck forward and arranged for coffee, drugs and dressings to be placed on trolleys either there with a large bowl of I or 20 carbolic towels and bandages. The workroom was also cleared and drugs and dressings left there provisionally. I was wearing a clean white dent suit like the other officers, and had a sprague with morphine attached to my jacket pocket. The morphine being contained in a small rubber capped medicine bottle. During the succeeding watch, which took us across the Adriatic to within a few miles of the Albanian coast and Durazzo morphine was the only drug required. The ship was not full and we contained no contagious energy that the quarter master who was mooring the ship from beneath the bridge, had to be relieved of his duties as he became acutely hysterical. I promptly gave him a hypodermic injection of I gr of morphine and had him released, after which he became quiet and gave no further trouble. We were in the rear of the attack Area, Dark and Goodwin acting as meteorologists for the heavy Italian vessels, the San Giuseppe and San Marco. One of our light cruisers, RIMS Wyvern, was hit by a torpedo in the stern and had to leave the line being brought back under tow by destroyers in Brindisi. The action was short, lasting no more than an hour and a half and I felt saved by the sound of the heavy guns from the shore batteries and shells screaming through the air towards and around us. Once I was phlegmy into the sea just missing an Italian torpedo boat, a column of water and spray being thrown up vertically alongside it.

After the action we were met for a refit and boiler clean in the dockyard at Genoa, where we remained most of the time in dry dock for a fortnight or so before being directed to report the fleet which on the 11th November Arrived in Brindisi. We had cleared up the Dardanelles in Constantinople so it was then called

destroyers being based nearby on the Gulf of Genoa, which made a good anchorage and was about the same way to Suez. Flow along in position was maintained and the railway line running to Hagfled passed along it.

In January 1916 there leave was granted and I and another surgeon practitioner called Kerr of the Clyde Ordnance took the opportunity of going up to Malta staying two nights there in an hotel seeing the famous Durzo Cathedral with its remarkable statue of the saint who had been almost alive and whose martyrdom was exposed. It was evident that the sculptor had excellent knowledge of the anatomy of the human body. The next day we spent on Lido Corso, fear of us making up a party with myself, Kerr and two Australian military officers, and we went on the late steamer from one end to the other, seeing many very beautiful villages en route. On leaving Genoa, at the end of the night we called at Spezia, the Italian naval base, to refuel with oil and change our voyage to Malta was taken between the coast of Italy, Corsica and Sardinia, the ship being stocked out and regaining its usual, but nothing unusual happened although on the eve of the Armistice we received a signal that RMS Brennus an old pre-Drakeburgh type of battleship, had been torpedoed in the Straits of Gibraltar.

We arrived at Malta, and it was my first visit to the island on the morning of the 11th November, steaming into the anchorage under Fort St Elmo to the accompaniment of the search lights of Valletta, which were pointing profitably in honour of the official beginning of peace. Having several to sleep in Dockyard Creek, where there was granted to officers' and men, and one of the first persons I met that day in Valletta was Arthur Elton, MA, myself a surgeon practitioner and in my own part of Queen's. We had a wonderful time doing some sightseeing in Valletta, in particular visiting the same churches which was celebrated for

the depths of its atmosphere. The ship was formed of human bones, all an excellent state of preservation. Arthur Eaton said I celebrated our reunion by dining together at the Great British Hotel in the Straits Settlements and nothing more was then to have been done. But we had a great deal to talk about, although his experience in the ship *Atika* Ploeromandir did not seem to have been so varied as mine. Two days later we sailed for Constantinople, taking Captain G. Pandrea as passenger and an amusing spectacle watching as the ship was preparing for sea and leaving the Grand Harbour. The captain had been a little worried by the loss to hospital of the First Lieutenant who had developed an overcoat but on the most tender part of his anatomy, which I had unsuccessfully attempted to lance on the passage down from Greece. At my side the captain was a little confused in his mind and seemed not to comprehend the fact we were in the Mediterranean. He came on deck wearing an ulster and a two-wheeler with one boot, as if he were about to enter the North Sea. Standing forward along the main deck a sailor had ironically pinned himself in an open mantle on the deck and thus proved an irresistible target for the captain who, sitting in cabin, tried to plant his heavily loaded feet in the hold of the unfortunate man, and then later that evening, while on the bridge or descending the ladder from it to the decks, fell and did all but destroy his shoulder so that I was called to his assistance. In place of the First Lieutenant we had a First Lieutenant R. H. named Wells, who acted as surgeon and was first class at his work. Poor Wells suffered from indigestion but never gave ground or went off duty because of it and we became close friends. It was hoped that his father or some other descendant was a very high ranking officer but we never discussed the matter. Our voyage from Malta took us up past Cape Marsovas in the Aegean and thence past the Island of Samothrace and Thessalonica near to the entrance to the

Dardanelles, thence across the Sea of Marmara to Constantinople and finally to our anchorage of land.

I had always had a particular aversion against the ship. Often we would take the dinghy and go ashore in the surrounding countryside, calling on farmers and bartering against or such like goods for alcohol, or even vegetables. There we raised a flag by force from the Straits and played a match against the officers of *Zamovev*. I played in the game and remember that on our side was a large Crumley, N.C. of Zedrasian fame. About twice a week it was our turn to make the duty trip to Constantinople and there we would be alongside the Golden Bridge for an hour or two. On one occasion an elderly surgeon commander took me and Wells on a visit to the Mosque of San Raphael which only recently had been returned to its proper use, for many years having been used as a stable for horses of the Turkish cavalry. I remember the Fleet Surgeon bartering with the Turks in the underground houses for carpets and the amazing effect when he produced a 11 pence and explained the situation on the bank during the House of Commons at Westminster. It was apparent then that British currency was much sought after and considered by other nations to be of great value. At that time Turkey was being deluged by our dried Roman's coins. In a shop in Constantinople I was able to acquire some 300 roubles for a second hand pair of shoes. A lady in the *Zamovev* went one better by bartering her motor bicycle for a liberal sum of roubles, but unfortunately the deal fell through when it was found the paper notes were worthless.

It was not an infrequent occurrence when walking about the streets of Istanbul to encounter numbers of German notes from the battle crated Churches, which was long since the American in the exchange at Larnak. One suggested that there would be

monthly over these tortuous meetings but in the interim the Germans inevitably slipped aside of the schedule and sailed as they pleased.

On about six occasions the dense link on the duty of mail and dispatch boat between Constantinople and Sevastopol, the journey occupying about 36 hours, depended on the weather which was often very bad. On another occasion when we entered the Black Sea it was in company with an old freighter, the *Jules Michélev*, and the destroyer, *RAM 384*, our object being to "show the flag" and enforce the removal of the Armistice in Turkey. Crossing along the southern shore of which we, we called at various places viz Sinope, Samsun and Trabzon, on each occasion the captain gave orders and pressing his credentials to the Turkish governor. Language was often a difficulty, none of our officers speaking French or German, and on some occasions I was taken along as interpreter. One night there was great excitement on shore because of full scale rioting by the Turks against the Armenians and late Lieutenant Gelin arranged for a landing party to be put ashore, if necessary. It was armed with field rifles and a German revolver, Gelin encouraging me to practice with the gun on the quater deck. Fortunately, our vigilance was not required and apart from the sounds of shooting ashore, the night passed without event.

We made at least four trips to Sevastopol and Gelin and the captain and myself arranged to make a tour of the old Crimean battlefield of Balaklava. The town itself was certainly very disturbed with the population mainly keeping indoors and shops closed, a fearful apprehension gripping them. Our ship lay in the dockyard within easy proximity to the town and the houses overlooking the ships. At night there was occasional sniping all the time and it was very cold with the temperature below zero although now the ground was open of

Donald Ross's recent article. I was most comfortable. One evening the women of the landing party were again called, this time to give support to a detachment of Royal Horse Guards who were occupying the town station and guarding its communication lines. The possession of which was under dispute between the "Reds" and "White Russian forces." I shall never forget the sight of that station with some three or four hundred Russian prisoners and their families waiting for a train to take them out of the beleaguered city. They lay sleeping across the tracks on the freezing cold with little hope of escape, as most of the rolling stock was out of action. On another occasion again at Sevastopol, when the captain had gone ashore with Gelin, and Wilks and I were the only officers left in the ship, a commotion began on board a large Russian yacht lying aside down — it may have been an ex-Royal yacht. At my side Wilks and I were both frightened, but we went on board the yacht, each of us armed and with a sailor accompanying us and made a thorough search. Everywhere there was destruction, smashed mirrors, broken chairs and carpets defiling the walls. When we penetrated down to the main deck we found a few considerable sized rabbits in one of the cabins but it was quickly extinguished, and there was no further disturbance.

On Christmas Day 1918 we lay alongside a cruiser *RAM 384* *Poroskoff* and close to *HMVS Taurone* and there was great exhilaration in down to-recreation a Russian was selected as captain. He wore the commander's dress hat and uniform perfect as he marched about the deck accompanied by a party of other Russian pretending to make an inspection. Afterwards the officers made a round of the messdecks and the main forward deck. This was followed by Christmas dinner although I cannot remember whether it included turkey or goose. That evening, at about midnight we slipped out of Sevastopol and

proceeded along the coast to Yalta to come to the aid of a beleaguered Grand Duke and his wife — the Grand Duke Alexander and the Duchess, who came down to the quayside at about 07.00 in a typical Russian style drosky and were taken on board, together with their wife de camp, a young Russian noble known as Prince Orla. The journey back to Sevastopol took only about two hours and during that time I had to render first aid to the Grand Duchess who was very weak, and had difficulty in managing the vacuum pump at the head. At Sevastopol we turned the Royal party over to the captain of the *Allegro* and they were taken down to Malta. Prince Orla told us that less than a week before some ten or twenty officers of the old Imperial Forces had been lined up on the wall of the bastion and shot out of hand by revolutionaries. By contrast, our Commander-in-Chief, with a view to suppressing the unrest in the town, hanged six men from the yardarm of HMS *Zeus*.

Later we made a trip from Sevastopol to Novorossiysk on the far side of the Black Sea, the object being to land two officials as agents of the British Foreign Office but in February we were detained away from Soona to misinterpreting orders to and about the approaches to the Dardanelles. Several fire mines were brought in the harbour by Germans and destroyed by rifle fire and there were some sailing minelays when a fire mine drifted past the ship, almost within touching distance. Two or three merchant ships, Greek or Turkish owned, wandered out of the swept channels a warning then being conveyed to them that they were standing in danger by a dark band across their bows.

We made several captures ashore at the Dardanelles on the site of the former battlefields which then had not been demarcated, and we came across many grim sights such as a half-dressed corpse caught in the barbed wire line of machine

and iron dismounted beds from the explosion of a gunboat. One of the sailors, who had been granted shore leave, brought back a human skull but when the news discovered it they became very worried, fearing the man of hanging had luck on the ship and a small detachment of sailors waited on the captain to secure the skull's removal.

Later in February our ship hosted a party of passengers and set out for the journey home. On the way we stopped two nights at Malta and I met Victor again, the two of us attending the great busy dinner hall held in connection with the Malta Carnival celebrations. At Gibraltar we made a second stop and met many of the destroyers en route for Malta to relieve us. Amongst the flag we encountered had weather with heavy seas, and when Ross had repaired the ship at Malta I had found a temporary cabin in the narrow after end of the ship or rather flag which was a noisy place being directly over the screws, poorly ventilated by means of a manhole in the deck and liable to be flooded by rain if the manhole cover was left open.

On arrival at Devonport the ship was moored in Spithead Creek, and proceeding to the Naval Barracks I was issued with my demobilisation papers and some back pay before being released from the service. I recommenced my studies at Queens in the following summer term.

ENVOY

In this brief account of the Turkish probationers one is aware of its incompleteness and lack of detail. It should be possible to know more of their attitudes than have been mentioned, but I have tried on the slender evidence still available after fifty eight years to collect such and to show that their appointment as a human experiment was well worth while. Unlike their predecessors in the 17th and 18th centuries, surely did they share their

responsibilities and privileges, and a few actually gained official recognition during the war through being decorated in action for their gallantry or devotion to duty. Their numbers should not be allowed to fade totally into oblivion. Medically speaking they achieved little more than a well trained sick berth attendant could have done but such were their not available and in small ships — the destroyers and sloops especially — they filled the gap abominably by performing the functions of doctors, giving their ships' companies that measure of confidence which has ever been shown to be essential to health.¹

In the Second World War the experience was not repeated. More qualified doctors were available and both the naval and medical authorities took the view that medical students should be exempted from naval and military service and allowed to continue their studies without interruption until they had obtained the necessary qualifications to enable them to practice as doctors. There may be overwhelming arguments in favour of this attitude but for any of the former seagoing professionals would deny that their employment at the tender age of nineteen or twenty gave them a view that on their profession, an attitude of mind which they could not have acquired on civilian medical students. It gave them too the opportunity of taking part, however small this was, in an open experience which at the time it was believed would make another great war impossible to conceive. The seagoing professionals were in their formative years, that is they were especially susceptible to new or novel ideas. Their period in the navy beclouded their outlook and although in those days little attention was paid by their teachers to psychological

aspects of medicine, it provided them with practical day to day experience of such and helped to bridge the gap in their training curriculum.

To day the threat of a new world war seems remote, conflicts between nations being replaced by a world wide tendency to civilian revolt against many previously established customs but the navy remains as important to the country as it ever was but the words of Surgeon General May in 1914 are no less applicable. The loss of continuity in their academic or hospital studies had no harmful effect on the seagoing professionals. They lost nothing, their temporary contribution to war having a reinforcing effect on them as students, broadening their horizons and introducing them to the advantages of travel and inter communication with other professionals and in shaping their attitude to medicine and surgery they were greatly benefited by the little handbook of Professor R. J. Willis which was their constant guide.²

Although not under the immediate threat of a Third World War the reason is sufficient for the effects of an international trade recession which has given rise to a spirit of unemployment, and in our country an exceptional degree of deprivation of our currency. Many costs have made it difficult to maintain an ideal Naval Medical Service. It is an question of there being a scarcity of doctors as much as the high rate of concentration which like other workers they require.

In the medical schools throughout the country the importance of introducing into the medical students training the principles of psychological medicine have been recognised. Encouragement is given to medical students to serve for a time under the supervision of well-established practitioners to make better men for those dealt with relatively trivial complaints whilst still having their principals to fall back upon in case of need. This system which has assisted also the employment of trained

¹Confessions of one less than official in early war. They say Admiral F. J. Willis writing in 1914 noted "In many instances recruits arrived with the seagoing professionals were a great assistance particularly in the small fighting units. Their attitude is rather good confidence in the ships company."

body temperature is defined as the degree of protein in the body as it gives off heat from within. Thus the traditional average of the rectal, axillary and inguinal sites for circulation control, is not valid.

I especially recommend to you reading *Infant Mortality in Southampton* by G. Matthews, Wadsworth and Pyle, 1971. Papers with Matthews and Pyle and another, David Alexander, regarding malnutrition in their own papers are extremely interesting. I thought it is a shame. The first edition in 1955 just makes one wondering whether this I must admit to being somewhat of a coincidence when I read with surprise that being malnourished produces malnutrition.

Protein in nutrition is vital, especially malnutrition in the early of the general population and especially children is a place to be looked. The traditional protein in protein that I was disappointed to find a number of papers in which which had support through the great thinking malnutrition. Nevertheless, I would like to say that up without malnutrition, the body is essential to the first protein malnutrition, and the concept of the whole protein malnutrition by the malnutrition and malnutrition.

This book is not for those who believe in the early malnutrition of children and there is an attempt to say. There is no way, however, that I would recommend it as a malnutrition malnutrition in the malnutrition that altered concept of malnutrition. It might well be a malnutrition malnutrition from their protein malnutrition malnutrition.

FWS

CLINICAL CHEMISTRY IN MALNUTRITION AND TREATMENT J. W. F. (Eds) P. H. (Eds) Second Edition. 1976. London: John Libbey Medical Books Ltd. £4.50.

While in medicine it is not only important to know the clinical picture of the malnutrition of the malnutrition but also to know the clinical picture of the malnutrition. This is the second edition of a book that is not only important to know the clinical picture of the malnutrition but also to know the clinical picture of the malnutrition. This is the second edition of a book that is not only important to know the clinical picture of the malnutrition but also to know the clinical picture of the malnutrition.

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There are several books available on malnutrition and malnutrition and that is as good as any I have seen. It is a book that is not only important to know the clinical picture of the malnutrition but also to know the clinical picture of the malnutrition.

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LW77

A HISTORY OF PHYSICAL LIGHTS IN MEDICINE IN THE 19th Century. 12 illustrations. By J. H. Lamb. R. K. Lamb. 1976. 120 pp.

The 19th century was a time of great change in the history of medicine. The 19th century was a time of great change in the history of medicine. The 19th century was a time of great change in the history of medicine. The 19th century was a time of great change in the history of medicine. The 19th century was a time of great change in the history of medicine.

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JW7

MODERN TREATMENT. 1976. Medical Association. 120 pp.

This book is a collection of articles published in the 1976 volume 113 and 115.

Although some of the articles are devoted to the treatment of disease, many are devoted to the general malnutrition of the malnutrition of the malnutrition. This is the second edition of a book that is not only important to know the clinical picture of the malnutrition but also to know the clinical picture of the malnutrition.

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LW77

SEVENTH NEWS

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WILLIAM CAPTAIN E. J. CROOKER, JR.,
LIEUTENANT, U.S. Navy, died on December 30, 1976 at the
age of 38.

Hispanic Affairs of Congress advised the Royal Spanish Embassy in Washington as a Spanish Ambassador (October 1, 1907). He was promoted to Spanish Ambassador, Comander in Chief, (1917) on Spanish Citizenship in 1918. He was a Spanish Captain in Mexico, and was awarded the Order of the Aztec Eagle (1918).

Keywords: *depression; self-esteem; social support*

[illegible][illegible][illegible]

It was very clear that limited-level and other organizations in FY2004 were made in FY2003 and not recommended by the third through fifth groups that made the other decisions. But as level by level a bigger number of

Over approximately 100 years, the value and use of the monument has changed and will continue to change. Every year, the monument is visited by thousands of people, and the monument is a source of pride for the people of the state.

will have many things to discuss with the judges and attorneys who will hear their cases at the Perry trial court, and in the case of a conviction, sentenced to death for life without parole.

MISS JANE CROFTON, 22, 4000th Street, Portland, Ore., has been named as the 17th of the sons of the future to the Royal Naval Reserve.

Andrew Blaustein, who was one of the original members of the Soviet Jewish Defense Network, was flown to a January 1980 in Berlin and immediately placed under house arrest in the Westphalian District North in April 1980. He passed the LEB examinations at the Soviet College of Languages in Berlin in March 1979, and when it was in January in 1980, he passed the Soviet Navy in a Russian Performance (LERN) in March 1980.

After just over a year employed in general medical wards at St. Michael's Hospital, Dr. Henry was recruited to the first laboratory in the government hospital system where he joined Dr. J. H. Campbell at St. Mary's in June 1917. He remained at St. Mary's until the First World War and joined the Department of the Royal Navy where he stayed until his departure from the service in 1920. Although patient records were not at the age of 18 in 1941, the information on recruitment and service from the Ministry of Health and the

Thinking that all papers under his report is predominantly from working in the several departments of the state hospitals as well as in connection with the department of Agriculture and Forestry, and the Department of the Interior and the Department of the Navy, he is pleased in the relatively effective Department of the Interior that the several divisions were very rapidly expanding during the early years of the Department.

The 1992 Plymouth Township Legislative Commission (LC) was formed in 1992. Plymouth Commissioner John J. DeLoe, 1 FLETC and 4 Superior Captain (SC) retired on the 1992 and 1993 FLETC.

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When we do our calculations, however, we'll be approximating the energy for two walls. (You'll agree that having length \approx twice the first 2 walls will reduce errors of 50 percent or more.)

Blackburn's *colletes* were always abundant and were nothing to him, except as important when he needed. Long days were always put in, regardless of hour, in fact he was in better luck than he was. Most of the time, California and Mexico were his main source of the bees he collected, and he had a large collection of them.

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1. *Journal of Management Studies*, 1996, 33, 1, 1-14.

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Long Service Awarding of J. P. Keady, OBE, DFC, ARMP FROM FRANK McLeod
Director-General (News)

Editorial

Progression in the Service I have been assured, as this water weed grows in a pond, it flourishes unseen until it breaks the surface and in the sunlight flowers and is seen again. Certainly after thirty years' preparation three years in office seems too short for a Director who seeks to achieve change and establish new modes and ways.

Someone Well Adjusted to James Watt RMC (MS, MD, MR, FRCP, FRCS, was Medical Director General for over four years until his retirement in March of this year but as Professor of Naval Surgery and Dean of Naval Medicine, he has been an influence in the centre of the Naval Medical Service for a decade. Indeed, long before that he was one of a band of progressive naval medical officers determined to establish a greater and more general professional and competence in the medical service and particularly in Naval Hospitals, in that task they have been ably successful and the fruits of their labours now tend to be fully deployed for the benefit of the Navy.

James Watt (1928) with many honours and more achievements I am sure he would choose a full red hat map as a symbol of his honours which reflects his services and achievements. The Gilbert Blane Medal — a proper medal for a naval medical officer — for his work in grades surgery on naval personnel his mentorship of the career of the naval medical society, the Medical Society of London, his bacteriological knowledge in, and use as an

Histories, Vice President of the Royal College of Surgeons.

But what of his achievement? It is too soon after his retirement to evaluate his achievements as MDG and to know what will last — though it is certain that many of his organizational innovations will form a base for future evolution: the reorganized Medical Department, the reorganized support structure of Naval Hospitals, the reformed Medical Services Branch and the Medical Flag structure — all these will evolve. His successful performance will remain in life in the administrative nucleus of the MOD (DMSAC, the James Watt Report) will pass, the major requirements re-evaluated and some of its vital detail for its skill not implemented but some real merits will remain.

In a period of severe economy pursued with unprecedented administrative parsimony which severely limited managerial effectiveness James Watt has been responsible for holding the line on assistance. The price for him and his others, has been high but the assets preserved should form a base to identify the real targets for further cost containment.

Sufficient time has elapsed for his achievements as an MHA to be clearer and the limited rebuild of the Institute he founded — much more than a mere evolution of the RM Medical School — proceeds. The support structure with its mix of expert staff involved in the map in research and in operational support,

provides an essential contribution, like a catalyst, to the improvement of personnel care conditions, and effectiveness, in the maritime environment. As the importance of Human Factors research and services becomes more widely accepted the vital link forged by the Institute's unfettered expert medical officers between users and the bench, both in the workshop and the laboratory, must be acknowledged. It is this link with the Fleet which motivates readers in the Institute's activities.

Currently the Institute's three spheres of activity mirror James Watt's own naval career. His dedication and drive for professional standards in training, his conviction that research programmes was essential to the professionalism needed for the care of patients, and his sincere concern that every naval medical officer's experience whatever his particular field of employment should be devoted to achieving that care, are all well known. But many will have forgotten the Fleet links though these have been ships other than James Watt's *SALUSARY* involved in

watching his life.

We wish James Watt the best achievement, a happy, busy and long retirement with his friends, his professional and personal interests, his Naval Christian Fellowship, his music and his patients. A time to relax and enjoy.

Meanwhile his successor, Acting Surgeon Vice Admiral J. S. P. Rawkins *CMB, OBE, MBE, CBE, FRCM, FRCS*, an immediate predecessor in this Institute and the former Editor of this Journal, occupies the No. 1 post at present assigned to the third floor of Roppongi State Building. A champion of some words in his early days, he attended his practical academic training by a Divisional scholarship in Anatomy after entering clerical practice and naval service. But John Rawkins, naval medical services has been truly quarantined with service in surgical careers and research appointments in overseas and metropolitan medicine. His flesh and bone will welcome his office as he reshapes our Service into the cod of the sciences. He can be counted on for support and good wishes.



Acting Surgeon Vice Admiral Sir James Watt and Surgeon Vice Admiral John Rawkins, OBE, MBE, CBE, FRCM, FRCS, who replaced him in *The Heritage of Naval Medicine* on March 11, 1971.

The Use and Abuse of Antibiotics

F. D. Clarke and N. F. Lightfoot

ABSTRACT

With the ever increasing range of antibiotic available the medical officer the choice of the correct antibiotic becomes more difficult. This article discusses the problems of resistance, side-effects and toxicity and depicts the potential resistance in specific clinical situations.

Introduction

It is now over a decade since our completely new antibiotics have been discovered, the last being tetracycline. Since this discovery there have been a number of modifications of the various families of antibiotics but these have been so many that chemical manipulations and so many instances the resistance in the parent compound has also meant resistance to its later offspring, the most notable exception being the penicillins resistant *Staphylococcus aureus*, *Streptococcus pneumoniae* and *Haemophilus influenzae*. The resistance of bacteria to antibiotics is a cause for considerable concern in recent years and examples are easily found such as the resistance of *Haemophilus influenzae* to ampicillin first described in the United States of America (Thomas, 1974) and now being increasingly noticed in this country (Turk, 1974). *Escherichia coli* resistant to chloramphenicol has recently been described in a major outbreak in Mexico (Gonzalez-Correa, 1974) this drug had previously been the treatment of choice for the various infections. In only the last few months the emergence of truly resistant *Neisseria gonorrhoeae* producers of a highly potent penicillinase have been reported not only in the (Phillips, 1974) but

also in several other countries (Goldberg *et al*, 1974). This development was so predictable as the increasing resistance of the *Streptococcus pneumoniae* to tetracycline and the discovery of penicillinase producing and thereby highly resistant *S. pneumoniae* in New Guinea and parts of Australia (Maitland & Butler, 1974). Amongst *Staphylococcus aureus* increasing resistance to penicillin is seen in the hospital environment and the specific development of *Staphylococcus aureus* to antibiotics such as erythromycin, clindamycin and fusidic acid is dependent upon the heavy use of these antibiotics in the immediate community (Table 1). If the use of antibiotics is restricted however, there is evidence from many areas that the microbial flora of the hospital soon becomes sensitive to those antibiotics which have been little prescribed and their value is therefore considerably increased in the emergency situation (Forster, 1964).

TABLE 1

Antibiotic resistance in *Staphylococcus aureus* and *Streptococcus pneumoniae* in the community and hospital

Antibiotic	Community		Hospital	
	<i>S. aureus</i>	<i>S. pneumoniae</i>	<i>S. aureus</i>	<i>S. pneumoniae</i>
Penicillin	100%	100%	100%	100%
Ampicillin	100%	100%	100%	100%
Tetracycline	100%	100%	100%	100%
Erythromycin	100%	100%	100%	100%
Clindamycin	100%	100%	100%	100%
Fusidic acid	100%	100%	100%	100%

It is clear therefore that a method by which organisms that spread acquired resistance between themselves and different species and the emerging development is out of the main focus in the community

evaluation of growth-negative organisms in the microbiologically antibiotic-free media as permanent blood (PES, Wachtel, 1970). The effectiveness or unnecessary use of these antibiotics will greatly decrease their value in the future even if there may be some marginal advantages to patients in these prophylactic use at the present time. Should any doubt remain that patterns of resistance amongst bacteria are directly related to antibiotic usage in the environment one has only to compare organisms isolated in general practice with those isolated in the hospital environment to be convinced of the causal link of this statement.

In view of this overwhelming evidence that we may be putting our patients at a long term disadvantage by overuse of antibiotics both at home and outside a discussion of the rational approach to the use of antibiotics may be timely.

Basic Principles of Antibiotic Prescribing

The following basic principles should be considered whenever an antibiotic is prescribed:

1. Patients should be treated with regard to their clinical state and not solely on the results of the laboratory investigations. The isolation for example of a *Proteus* species from a leg wound following clean flap surgery is very common and yet it is rare for these organisms to be the cause of that infection. The use of antibiotics therefore is contraindicated unless there is clinical evidence of infection.

2. Broad spectrum antibiotics should not be used to treat infections caused by organisms sensitive to an antibiotic with a narrow spectrum. These broad spectrum antibiotics are those most commonly chosen, leading to their eventual loss of effectiveness in valuable clinical circumstances. A typical example of this is the use of a broad spectrum antibiotic such

as tetracycline or ampicillin to treat an *S. pneumoniae* infection of the lung where broad penicillins would be the treatment of choice. The use of tetracycline in particular has led in at least 30 per cent instances of *S. pneumoniae* to chest infection and the loss of effectiveness of this broad spectrum antibiotic in the management of acute respiratory viruses and bronchitis later.

3. The decision to use an antibiotic should be made with care that even modest though given in adequate dosage and by an effective route. That the oral absorption of phenoxymethyl penicillin is so poor and unpredictable that at least 500mg 6-hourly and preferably more is required to achieve adequate blood levels (Gower *et al.* 1975). Anything below this dosage cannot reliably be used to be more than a placebo. As far as the route of administration is concerned it is worth remembering with real satisfaction that the timing of the dose with relationship to food is important. Tetracyclines which are bound by milk in the gut and the absorption of aminoglycosides which is reduced by fruit juice are notable exceptions and must be taken into account when the prescription is made. In oral penicillin administration of antibiotics is essential in any severe infection. Bolus doses should be used intravenously except in the case of tetracycline and aminoglycosides when a longer infusion is required. As a general principle do not mix antibiotics with intravenous fluids as considerable loss of activity may occur.

4. The side effects of antibiotics should be considered carefully for permanent and reversible damage may be caused. Examples of this are the irreversible use of tetracycline in children leading to the staining of the permanent dentition. Cephalexins particularly if combined with fructose may lead to permanent renal damage (Ford, 1969). Gentamicin may lead to blindness if dosage is

uncontrolled and in combination with tetracycline may produce irreversible renal damage. Separate in the aged and pregnant may lead to fetal deformity.

5. There are few indications for combined antibiotic therapy. These include endocarditis, infections of compromised hosts, life threatening infections with unknown organisms or where organisms with differing sensitivities are known to be present. Examples of useful combinations are gentamicin with cloxacillin in severe infections with organisms derived from the bowel and fusidic acid with cloxacillin in fulminant staphylococcal septicaemia.

6. The main aim lies in establishing the antibiotic therapy with himself, his colleagues and nursing staff and he knows his antibiotic prescriptions on a regular basis. Consideration should be limited to not more than 7 days unless special circumstances dictate a longer period for example in osteomyelitis or osteocutaneous bacterial sinusitis.

The Reservation of Antibiotics

The advantages that may be expected from the introduction of an antibiotic policy into a hospital are manifestly reversed by Ayliffe (1975). Such a policy is now in force at the Royal Naval Hospital but its principles are equally applicable to general practice.

Antibiotics are divided into three categories such a policy.

First line antibiotics are acceptable and effective for sensitive organisms and no specific limitation is placed on their use. Antibiotics in this group include benzyl penicillin and phenoxymethyl penicillin, ampicillin, dicloxacillin and the urinary antibiotics and streptomycin, sulphamonomethoxime and sulisidic acid.

Second line drugs have either very specific uses or are being introduced in an attempt to improve or reduce their effectiveness. They include tetracycline,

erythromycin, erythromycin stearate, rifampicin and neomycin.

Third line reserve drugs either require great care in administration because of their toxicity or organisms are known to develop resistance to them which in other circumstances from one bacterial species to another (Shah & Datta, 1975; Weidart & Chubb, 1971). The aminoglycoside group of antibiotics namely gentamicin, tobramycin and kanamycin fall into this category. Other drugs in this group are reserved for life threatening infection only for example, fusidic acid in staphylococcal septicaemia not responding to cloxacillin, chloramphenicol in *B. typhosus* meningitis in children and the cephalosporins which retain great effectiveness in many severe infections as a result of their relatively low rate of present. Organisms rapidly develop resistance to fusidic acid if it is used alone and it must be used only in combined therapy. The last group of third line drugs are those with a highly specific use such as the anti-tuberculous drugs isoniazid, rifampicin, combined streptomycin, PAS and pyrazinamide.

Treatment of Specific Infections

Chlamydia Infection: In general species culture is not very reliable because the normal flora often includes the potential pathogen *S. paratyphi* and *S. dysenteriae*. In patients with chronic chlamydia infections these organisms may be frequently isolated during a period of clinical remission. In drug naive menorrhoeic, from negative organisms such as *Escherichia coli* may be isolated but their pathogenic importance is doubtful and their presence is probably due to previous antibiotic therapy suppressing the normal flora. Sometimes in the previously healthy patient however, a pure growth of *S. paratyphi* or *Escherichia coli* may be isolated and this will be extremely helpful in the

and dental management. As a broad principle, later progression to drug or infection with *S. pneumoniae* and benzyl penicillin is the treatment of choice. In circumstances of chronic bronchitis the first likely pathogens are *N. influenzae* and *S. pneumoniae* and oral amoxycillin is generally effective in both. Tetracycline may be used but there is an increasing number of resistant organisms appearing as a result of its over use in chest infections and it is therefore best avoided. Cotrimoxazole is an effective antibiotic in these circumstances but because of its valuable properties in other fields it is suggested that this antibiotic should be reserved. Failure of a chest infection to respond to these treatment regimens requires clinical and radiological reassessment. Cystitis suggests infection with *Haepthecoccus*. *Escherichia parvum* or *Moraxella* *catarrhalis*. *Haemophilus influenzae*. *Haemophilus influenzae* infection should be treated with cefazolin and *S. pneumoniae* infection with cefotaxime or an aminoglycoside. Culture of sputum may be very helpful in these circumstances.

In patients with post-operative chest infections an initial system should be made into those with previously healthy chests and those with previously unhealthy chests. In the former physiotherapy is the key to treatment but should antibiotics become necessary benzyl penicillin should be effective. In the latter physiotherapy is again important but the risk of staphylococcal and *N. influenzae* infection justifies the use of ampicillin and cloxacillin if signs of chest infection develop. This should be given initially by the parenteral route and changed by mouth when clinical improvement has occurred.

Tuberculosis is now treated by a 4-month drug regimen but this requires special supervision and it is strongly recommended that such cases should be referred to a Consultant Physician. Recent advances in treatment have been reviewed in this

journal (Clarke 1976).

Diarrhoea. There is often no bacterial cause and in most instances diarrhoea is due to viral infection or the presence of toxins in food both of which are unaffected by antibiotic therapy. Even in the event of a pathogen such as a *Salmonella* species or *E. coli* being isolated there is no evidence to suggest that treatment with any antibiotic will shorten the diarrhoea and it may poison the healthy carrier state. The use of antibiotics of the antibiotic containing organisms is to be deprecated, for it can only lead to the development of resistant organisms in the normal gut flora which may later transfer their newly acquired resistance to other more dangerous pathogenic organisms.

Mononucleosis. These organisms are responsible for most cases of mononucleosis beyond the neonatal period. Below the age of five *N. influenzae* is the most common organism to be isolated but both *Neisseria meningitidis* and *S. pneumoniae* may occur. Treatment with chloramphenicol and benzyl penicillin should be commenced as soon as the clinical picture is completed. It should be given by the intravenous route in full dosage. Over the age of five *H. influenzae* infection is extremely rare and treatment of choice is benzyl penicillin alone. The increasing use of rifampicin throughout the world has led to a considerable degree of resistance in the *H. meningitidis* and as a result they are now of no use in the infection (WHO Epidemiology report 1976). They should therefore be dropped from the clinical therapeutic armament of drugs in the case of *H. influenzae* infection. Evaluation of treatment for not less than 10 days is indicated but with meningococcal infections only 5 days of full therapy is required. In the case of the *S. pneumoniae* treatment must be continued for not less than 2 weeks. The reader is recommended to a recent review by Trautman (1976).

Enterococci. Any child with fever, pain, purpus and a leukocytosis should be considered to have enterococci and be treated as such. Treatment with penicillin and streptomycin must be started as soon as these blood cultures have been taken. Treatment is continued daily for not less than 4 weeks when the purpus has settled (Klein et al 1977). Surgical release of gas is essential and *Streptococcus aureus* will usually be isolated from blood cultures or pus. Alternatives though probably less effective forms of treatment are clindamycin alone or clindamycin with hefidin and Clavox. enterococci are principally a surgical problem and although antibiotic treatment as indicated by culture may be a useful adjunct, the underlying focus, not antibiotic in itself, must be kept in mind. The focus is to be greatly damaged, for it is these cases that are often the focus for cross-infection with resistant organisms as an enterococcal brand. As a general principle infected prostheses require removal.

Staphylococci. It is impossible to differentiate gram negative from gram positive organisms on clinical grounds alone but a good guess can normally be made if the likely source of the infection is considered. Severely seeping gram negative organisms originate from the gut and uro-genital system whilst gram positive organisms originate from the skin and respiratory tract. It is essential before treatment to take these and preferably use blood cultures.

Suspected gram negative organisms should be treated with aminoglycosides. If abdominal sepsis is the likely source of organisms then clindamycin should be added to ensure selection with anaerobic organisms. If the infection is a suspected gram positive organism then dicloxacillin, cloxacillin or cephalosporins are the initial drugs of choice. It is worth remembering that penicillins have a good activity against *Streptococcus* as well as the common gram

negative organisms and may therefore be used before blood spectrum confirmation the true cause of the ward. It is the extraordinary antibacterial spectrum that makes the drug so valuable and an antibiotic penicillin.

Site infection. Cellulitis is usually due to *Streptococcus* and hence penicillin is the treatment of choice. A spreading cellulitis from an abdominal wound usually accompanied by a foul smelling discharge is usually due to anaerobic organisms and treatment with clindamycin is the preferred. *Streptococcus faecalis* cause a spreading cellulitis that does not respond to local attention to the affected area. Daily baths are essential and no pressure must be allowed on the affected area in any circumstances. Swabs from the area should be taken daily to ensure that no potentially serious pathogens such as *Staphylococcus aureus* or *Corynebacterium* are present. *Pseudomonas*, *Proteus* and *Enteric* may commonly be cultured but are rarely pathogens. Antibiotics will only be of value in the rare occasions when there is evidence of tissue invasion. The most significant organisms are *Streptococcus*, *Staphylococcus* and *Chlamydia* and in the last case intravenous is essential. Hospital penicillin should be given at the same time.

Upper respiratory tract infection. Viral infections such as croup and influenza will not be influenced by the antibiotic action of antibiotics unless there is added bacterial infection. A throat swab should be sent for bacterial culture to exclude streptococcal infection and a swab should be carried out to exclude glandular fever. In acute streptococcal tonsillitis the treatment of choice is benzyl penicillin. In the organism is invariably responsive to this antibiotic. The response is usually rapid and in 24-48 hours a change to oral phenoxymethyl penicillin or ampicillin should be made. An alternative is to use oral cephalexin.

of long acting benzathine penicillin. It is reasonable to use any of the broad spectrum antibiotics such as ampicillin, amoxycillin or cotrimoxazole for penicillin and the first named of these commonly causes a rash in patients with glandular fever. In chronic penicillin use the usually effective though in some refractory cases the long acting benzathine — doxycycline may be the most effective agent. In acute viral mononucleosis if sulphazone sodium amounts for 26 per cent of the cases (BMJ Leading article 1976a) and therefore ampicillin is the treatment of choice. However strict criteria for the clinical diagnosis of acute mononucleosis are required to avoid over use of this antibiotic. Penicillin is only slightly less effective and many prefer its use. Local infection of the mouth with *Herpes* is commonly due to the use of a broad spectrum antibiotic which should be withdrawn before treatment with local agents.

Urinary tract infection

(a) Lower urinary tract infections

These may be broadly divided into two categories:

1. Uncomplicated infections

In the female where infection is acquired outside hospital and without signs to suggest any underlying abnormality the drugs of choice are those drugs widely reserved for the treatment of urinary tract infection namely nalidixic acid and nitrofurantoin or sulphamonomethoxime. If the results of culture show resistance to these drugs then cotrimoxazole is the first treatment of choice.

In the male there is invariably an underlying prostatic causing specialized management and referred to the GU Department. The antibiotic of choice is cotrimoxazole or ciprofloxacin given for not less than 3 weeks.

2. Complicated infections

Infections in patients with a known

urinary tract abnormality or in association with certain medical conditions such as diabetes or steroid treatment may be classified as complicated. Also included under this heading are infections acquired whilst in hospital particularly after the removal of a catheter. Patients should be treated according to the results of urine culture unless urgent treatment is required when they fall into the category of upper urinary tract infections.

(b) Upper urinary tract infections (pyelonephritis)

These must be treated on the basis of knowledge of local pathogens. Over twenty seven samples have been sent for culture. *Cotrimoxazole* is the best available antibiotic but in the more seriously ill patients an aminoglycoside such as gentamicin or kanamycin may be indicated and both require careful control. The cephalosporins may have a place in the management of serious infections of this type. Treatment should only be altered if the patient fails to improve and culture results show definite resistance. Ampicillin is best avoided in these patients as a high proportion of organisms have become resistant as a result of its extensive use in general practice (table D).

TABLE D
ANTIBIOTIC RESISTANCE

Antibiotic	1974	1975	1976	1977
Ampicillin	100%	100%	100%	100%
Cotrimoxazole	100%	100%	100%	100%
Chloramphenicol	100%	100%	100%	100%
Clindamycin	100%	100%	100%	100%
Flucloxacillin	100%	100%	100%	100%
Gentamicin	100%	100%	100%	100%
Kanamycin	100%	100%	100%	100%
Nalidixic acid	100%	100%	100%	100%
Nitrofurantoin	100%	100%	100%	100%
Sulphamonomethoxime	100%	100%	100%	100%
Sulphazone sodium	100%	100%	100%	100%
Tetracycline	100%	100%	100%	100%
Trimethoprim	100%	100%	100%	100%

In the asymptomatic bacteriuria found commonly in patients over the age of 40 there is little evidence to suggest that antibiotic will be of any value. The condition does not progress to renal parenchymal infection and treatment is unlikely to be effective in eradicating the organism. Similarly in colonized patients

antibiotics are rarely indicated unless there is evidence of systemic infection. Twice daily bladder irrigations of tetracycline or neomycin are usually adequate to keep bladder areas sterile. If infection persists after removal of the catheter then it should be treated as a complicated lower urinary tract infection.

Wound Care. The abuse of antibiotics in this field has probably not been exceeded in any other. The use of prophylactic antibiotics is extremely dangerous and has almost certainly been the main reason for the development of such a high degree of resistance in *S. pneumoniae*. Bacterial peritonitis is large damage is still the treatment of choice for peritoneal infection, although spectinomycin may soon take over its position. The indiscriminate use of broad spectrum antibiotics by personnel not skilled in the treatment of these infections is extremely dangerous and it is recommended that failure of the initial course of treatment with penicillin requires a mandatory specialist opinion. It is appreciated that this advice may be impractical in some theaters of deployment, so the most Medical Officers are strongly advised to seek advice from the specialist hospital centers prior to deployment.

Surgical wound infection. Infected wounds are best treated in the first place with herbs and local toilet. Antibiotics should not be used unless there is evidence of deterioration in the patient's condition as judged by clinical criteria. A rapidly operating officer is usually symptomatic in origin and requires urgent treatment with broad spectrum antibiotics. In abdominal wounds where the operation involved the bowel, peritonitis and abscesses are indicated on the first gross basis until results are available. Staphylococcal wound infection when clinically established should respond to dicloxacillin but it should be stressed that the necessary use of this antibiotic will

unavoidably lead to the emergence of resistant strains.

The initial treatment of abscess is by surgical drainage. Antibiotics will not be effective without this procedure. Only if systemic toxic signs are present should an antibiotic be used.

Prophylactic antibiotics in surgery. The use of antibiotics in these circumstances is to reduce the post-operative morbidity and mortality from infection and any advantage gained must be balanced against the disadvantages of the emergence of bacterial resistance. This judgement is a hard one and can only be made if careful monitoring of hospital organisms is carried out and the emergence of resistant strains interrupted by a regime commensurate with action in the relevant prophylactic antibiotic administration. For recent reviews of this subject the reader is referred to Coleman & Sanderson (1975), Roy (1976) and British Medical Journal leading article (1976b).

1. Pre-operative sterilization of the bowel. As all but the terminal ileum and large bowel have very low bacterial counts in normal circumstances there would appear to be no reason for the use of antibiotics in upper gastro-intestinal bowel surgery. The possible exception is that in full bladder surgery where it is suggested that the bile is infected (Diam, 1974). In lower bowel surgery it has been long standing surgical practice to prepare the bowel using mechanical means as well as to employ antibiotics, which remain localized to the bowel. However there appears to be little advantage to the pre-operative administration of neomycin in colorectal surgery since eradication of bacteria got well out contents is achieved and the hazards of amplification of organisms into the surrounding tissues at operation is not avoided (Thornett *et al.* 1971). There may be evidence for some increased risk of recurrence of tumour at the suture line in

these patients (Vick 1962) were conferred by Floyd *et al* (1965). The use of aminoglycosides, as pre-operative bowel preparation is very difficult to justify having in mind the resistance effects of development of resistance from negative side effects may in these results but at best there is only a marginal improvement of post-operative sepsis rates probably un-justified when weighed against the risk of development of resistant organisms.

2. Systemic antibiotics: A considerable amount of work has been going on in this field recently and most series show that it is possible to reduce the incidence of post-operative sepsis by administering systemic antibiotics. It thus becomes a matter of judgement by individual clinicians as to whether these improvements in morbidity and sometimes mortality are justified when considered against the alterations in the hospital acquired microflora flora.

Most work on systemic antibiotics and post-operative infection has been carried out in abdominal surgery. The evidence that antibiotic organisms were frequently responsible for infections in these cases led to the use of chloramphenicol and metronidazole, both highly active against the anaerobic flora as a prophylactic role. There is no doubt that in bowel surgery involving enterocolitiform types or in contaminated large bowel surgery post-operative sepsis rates may be considerably reduced by the use of prophylactic lavage (Kauflay *et al* 1976) but it should be pointed out, that in an extension of this series 4 patients developed pseudomembranous colitis and 1 died (Clark 1976).

There would seem to be little evidence in favour of commencing antibiotics much before surgery and possibly the use of short courses of antibiotics to cover surgery and the first 48 hours post-operatively is justified (Stokes *et al* 1974). Wilks and his

group (1974) have shown a marked reduction in post-operative sepsis by the use of metronidazole support since in gynaecological operations but the control group had a 28 per cent rate of infection which would be considered exceptionally high by many gynaecologists. Cephalosporins have been used with effect but it seems rather that this practice will lead to the emergence of resistance in some of bacteria (Fellack and Evans 1975).

3. Topical application of antibiotics and antiseptics: It has been shown that penicillin sodium iodide into the wound is effective in reducing enterocolitiform sepsis post-operatively (Gillies 1975) and although the use of antibiotics in the same circumstances may be effective (Parks, 1972) others have found the opposite (Gorey *et al* 1974) and in rabbits it may become toxic (King *et al* 1975). The use of antibiotics instilled into the wound seems somewhat illogical for it is hard to believe that they remain in the area for anything more than a few minutes. In most cases their action is dependent upon bacterial cell division, a process taking hours or days and it does not seem reasonable to suppose that they will be available to eliminate bacteria in that phase of their life cycle. Despite this several series have compared topical antibiotic preparations such as aqueous (Holt *et al* 1974) and cephalosporins (Fellack *et al* 1975) with conflicting results.

4. Skin preparation: Frequent evidence has been demonstrated to reduce the risk of infection with *Chlorhexidine* solution in those extensive areas particularly at risk, such as thoracic surgery (Lawley *et al* 1964). In these high risk patients the use of prophylactic broad penicillin G-S may well already be as well as justified.

Prophylaxis in Orthopaedic Surgery

In clean orthopaedic surgery the

consequences of infection are particularly disastrous and the temptation to use prophylactic antibiotics in these cases is high. However, there is little evidence to support the view that agents following their usage of this type is dependent upon anything but technique proper skin preparation and control of the immediate environment. This has been well demonstrated by Charley. Particular vigilance of these wounds is required such that at the first clinical signs of infection, namely pyrexia, inflammation, leucocytosis and purulent discharge, adequate and effective antibiotic treatment may be commenced.

The role of antibiotics in contaminated wounds involving bone is much more controversial. The consequences of chronic osteomyelitis and endosteitis are so disastrous that any improvement that can be achieved in reducing these complications is justifiable. Despite the heavier usage of the antibiotic therapy employed is cheap. Nearly all these wounds occur outside the hospital environment and in these circumstances, surely, all chemotherapy organisms will be penicillin sensitive. As penicillin is so much more effective than any of its antibiotic counterparts in destroying these organisms it must be included as a part of the regimen. There is a slight risk of penicillin resistant *Staphylococcus* being present and for absolute safety it is reasonable to add cloxacillin to the regimen but it should be remembered that this antibiotic is much less effective against penicillin sensitive organisms than is benzyl penicillin itself and it should not be used alone. The use of ampicillin or amoxycillin in these cases is thought for all *Staphylococcus* resistant to penicillin are also resistant to ampicillin. It is more effective against gram negative organisms but these are rarely pathogenic in these cases.

Conclusion The recent introduction of an

antibiotic policy to the Royal Naval Hospital is a first step towards rational antibiotic prescribing in the ward environment as a whole. But like any policy that is common good it is open to abuse and being voluntary there is no counterpart. Critical personal appraisal and self discipline are required for it to be successful and a close proof of the benefits of a certain course of action is wanting. Few soundly constructed clinical trials should be devised to provide an answer. A rigid policy cannot be made to fit all clinical situations but we believe that the broad principles laid down in this review allow a rational decision as both general and hospital practice to be made in most cases. There should be no barrier between disciplines for antibiotic prescribing is common to all. It is by training the areas of abuse and controlling them that the areas of proper use can be maintained and improved.

References

- WILLIAMS A. J. (1970) Antibiotic Policy. Lecture made at *Journal of Pharmaceutical Chemistry* 1, 251-7.
WILKINSON A., COLLIER C. & SHIMWAY V. G. (1974) Penicillin use: resistant penicillins. *Lancet* 2, 1014.
BAILEY BOWEN H. L., HUGHESON M. C. & LLOYD D. J. (1974) Clinical prospects in the treatment of wound infection: also appendages to *British Journal of Surgery* 51, 460-207.
THE 1974 BRITISH PHARMACEUTICAL INDUSTRY: *Pharmaceutical Development in England and Wales* 1, 49.
BRITISH MEDICAL JOURNAL (1974) Lecture given 1, 774.
BRITISH MEDICAL JOURNAL (1974) Lecture given, Antibiotic prescribing in hospitals 2, 120.
GILLESPIE C. G., THORNTON H., MILLER A. B., POWERS J. A., CORRIE J. N. J. & GILLIARD WILLIAMS J. (1974) *Antibiotic chemotherapy* with reference to prophylaxis, antibiotic in wound surgery. *Journal of Antimicrobial Chemotherapy* 1, 507-17.
GILLESPIE C. G. (1974) Antibiotics in the treatment of infections. *Journal of the Royal Naval Medical Service* 20, 25-32.
GILLESPIE C. G., SHIMWAY V. G. & WILLIAMS J. (1975) The place of antibiotics in clinical surgery. A clinical study. *British Journal of Surgery* 52, 574-80.
LLOYD D. J., COLLIER C. & CORRIE J. N. J. (1974) Local comparison of effectiveness of the wide and narrow spectrum. *British Journal of Surgery* 51, 115-120.
PARKER R. G. (1974) *Antibiotics in and the future*. *Journal of Antimicrobial and Chemotherapy* 1, 297-309.
PORTER J. G., KILLY A. J., SHATTACK A. P.

- DODD I. C. & BASH A. B. (1968) Local use of antibiotics and its effect on mycobacterial infection with particular reference to tuberculosis. *Lancet* 2, 951-955.
- ELIASON A. M., FLAHERTY D. & YAM A. P. & BUTCHERSON I. G. P. (1975) Studies with three gastrointestinal agents. *Antonie van Leeuwenhoek* 40, 39-43.
- ELMORE G. J. A. & SANDERSON P. J. (1975) An antibiotic pump: An applicator system. *Annals of the New York Academy of Sciences* 257, 384-391.
- ELMORE G. J. A. & SANDERSON P. J. (1976) Polyethylene drug-impregnated polyurethane catheter as antibiotic pump. *British Journal of Plastic Surgery* 30, 170-175.
- FERGUSON-JONES A. (1975) Maternal transmission of drug-resistant strains of *Mycobacterium tuberculosis*. *Journal of Medical Microbiology* 1, 289-292.
- GUYTON P. B., MORGAN I. M. P. & BASH C. H. (1975) Clinical, physiological and laboratory study of penicillin G as treatment of acute urinary tract infection. *Journal of Antimicrobial Chemotherapy* 1, 341-357.
- GUNN A. J. (1976) Antibiotics in urinary surgery. *British Journal of Urology* 48, 537-550.
- GUNN J. P., MCGILL M. W., BATTEN R. P. & FARRER R. N. (1976) A controlled trial of intravesical streptomycin in postulated pyelitis. *British Journal of Urology* 48, 495-500.
- HARRISON A. & MILLON M. M. (1976) Penicillin resistance in *Mycobacterium*. *Lancet* 2, 544-545.
- KIRKPATRICK M. R. D., GUNN J. P., SANDERSON G. W., CHAMBERLAIN T. & MCGILL M. M. (1976) Polyurethane catheter, antibiotic pump in urinary surgery. *British Journal of Urology* 48, 124-126.
- KUJAWA W., GUNN J. P. & FARRER R. N. (1976) The effect of streptomycin on experimental pyelitis. *British Journal of Urology* 48, 501-505.
- LAWSON D. J. L., GUNN J. P. & BELL J. P. (1976) Streptokinase treatment of urinary tract infection. *British Journal of Urology* 48, 129-130.
- PERLHANS J. (1975) Penicillins resistant gram-negative strains. *Lancet* 2, 536-57.
- PICKARD R. G. (1975) Treatment of pyelitis with oral and parenteral antibiotics at the parental level, with discussion of urinary infection. *British Journal of Urology* 47, 63-68.
- ROBERTS A. V. & STONE M. (1975) The prophylaxis of urinary tract infection with cephalosporins. *Journal of Antimicrobial Chemotherapy* 1, 395-400.
- STRAUCH A. V. & STONE M. (1975) Penicillin studies for the control of urinary tract infection: a controlled trial against oral and intravenous. *British Journal of Urology* 47, 69-74.
- SCOTT D. B. (1975) The prophylactic use of antimicrobial agents in the control of the urinary tract. *Antonie van Leeuwenhoek* 40, 253-258.
- SHAFI M. A. & BATTEN R. (1975) Intravesical streptomycin in urinary tract infection with *Escherichia coli*. *Antonie van Leeuwenhoek* 40, 259-261.
- STANTON T. J., WILKINSON P. M., PHILLIPS V., WALLACE & COLLARD C. (1976) Bacteriuria during catheter prophylaxis in surgery. *British Journal of Urology* 48, 197-199.
- THOMAS W. J., HUGHESDALE J. W., MOORE R. J. & KULLIVY D. W. (1976) *Mycobacterium thermophilus* infection. *Lancet* 2, 323.
- TRAMER D. C. (1976) Management of infected urinary catheters. *British Medical Journal* 342, 563-564.
- TYRRELL G. C. (1976) Antibiotic sensitivity. *Mycobacterium thermophilus*. *Lancet* 2, 493-495.
- YONG M. (1975) Local treatment of cancer in the large bowel. The use of streptomycin solution as local chemotherapy. *British Journal of Urology* 47, 443-447.
- WILLIS A. T. & STONY GROUP (1976) *Mycobacterium* p. the prevention and treatment of urinary tract infection in gram-negative strains. *Lancet* 2, 1549-1553.
- WILLIAMS J. L. & CHAMBERLAIN T. A. (1976) Streptomycin resistance in *Mycobacterium*. *British Medical Journal* 342, 131-132.

Whither the Tonsils?

P. W. Reed

ABSTRACT

The paper discusses how far we are today regarding the removal of tonsils and adenoids. During the day, I think they has been a world wide epidemic in the number of otitis operations carried out. The current evidence is put forward together with my experience in the field.

Introduction

Tonsillectomy and adenoidectomy are amongst the most commonly performed of all operations. The question of the advisability of such surgery is an extremely common subject. No less than 1,500 papers have been published in the past 25 years and despite these apparently tremendous attempts to reach a solution to the problem, medical opinion remains largely divided as any clinical meetings on the subject will soon prove. Various authors assessed the situation and pointed out that a wide range of problems arose when attempts were made to evaluate the results of tonsillectomy/adenoidectomy: it is difficult to carry out controlled trials and possibly unethical to withhold operations from a child when the Consultant considers merits removal of T₁ and A₁. It is also impossible to obtain from the patient/parent or doctor, that the tonsils have been removed and such knowledge may colour the assessment of the post-operative state of health. In any wide survey, account must be taken of network of social and economic factors which may drive the patient towards the ENT Consultant. It is also clear that marked variations occur in the operation rate in different geographical areas — even different areas within the same country. In the recent survey of otitis

media distribution in tonsillectomies by Alexander Horstlin (1985) noted that the percentage of tonsillectomized children under 15 years of age only varied between 34.2 (social Class 1) and 33.6 of patients referred to Consultants. Social Class 4, in other times there is truly doubt that the majority of children T & A tonsils originated from social class 1 and that reflected parental ability to pay (per NHS) plus the more successful Reading School club that tonsils were best removed.¹

Operations on the adenoids were introduced around 1870 by Meyer and in subsequent years the number of operations on tonsils and adenoids showed a vast increase and it is now the commonest operation performed on children. The rapidity of the increase raised concern in all medical professions including ENT surgeons and it has been the concern that has led to attempts to evaluate the benefits or otherwise of tonsillectomy and adenoidectomy. Usually the procedures fall into disrepute as it was considered to be extremely easy to perform and was therefore carried out by non operators in surroundings with no back up facilities to deal with complications. Such situations were inevitably attended by an unacceptable mortality/morbidity for an operation that could easily be classified as minimal. Because of perhaps inadequate selection of cases and the frequent removal partly in the home or local surgery, in the treatment of non tonsillar conditions, the results left much to be desired and the overall

operation that tonsillectomy was a poor operation.

In reaching a logically balanced opinion on the indications for removal of the tonsils and/or adenoids, it is pertinent to devote what is the fraction of three eighths (three eighths) reached with a conclusion is logically follows that if the fraction is not considered vital then not to be proved that benefit accrues as the result of operation is rationally selected cases? Conversely maintaining good operating indications over the removal of tonsils (adenoids) postoperatively (systematic disease is later life? Over the years many authorities eg Mawson (1947), Venturi (1954), Rogers (1971) have approached the problem from different directions and discuss a variety of considerations.

The Role of the Tonsils

In such a survey as this a full account of tonsillar function is inappropriate. Suffice to say that much work has been put into this field in recent publications by Shapiro (1973) and Tachibana *et al* (1974). It is inevitable that the majority of work has been carried out on rabbit tonsils, these are the organs of tonsils (tonsils) because of the difficulties of experimental techniques. The consensus of opinion is that these structures are a part of the general lymphatic system and thus act as a filtering and defence mechanism against both bacterial and other foreign agents. It is clear that the lymphoid tissue in Waldeyer's ring including the tonsils differ from other lymph nodes in two important aspects (1) They have no afferent vessels and they lack thymus dependent small lymphocytes (2) The overlying epithelium is loose and permits direct access of bacteria and/or antigens. Recognized authorities such as, Veltri and colleagues (1977) have therefore suggested another role for the tonsils other than that normally accorded to lymph nodes. To prove this hypothesis they decided to examine immunoglobulin levels before and

after removal of T's and A's. Only 17 patients were subject to this research which involved the estimation of salivary IgA, as well as Serum IgM, G & G. The results of this trial showed that Serum IgG levels which were elevated consistently pre-operatively returned to the expected level of normality after surgery. Other immunoglobulins remained unchanged. The authors also carried out estimations of the antibody titre to childhood respiratory viruses and pathogenic bacteria. They found no significant variation in antibody titre as the result of tonsillectomy and concluded. Removal of T & A does not modify the basic immunological competence and that their removal is of no more significance than the deletion of lymphoid tissue from the tonsils (tonsils).

Sagan (1972) suggested that rabbit tonsils take part in the immunological process as non regional lymph nodes and are involved in antigen uptake. The experiments of Tachibana (1974) suggest that the human tonsil can produce two different types of lymphocytes which have immunological properties similar to the thymus and spleen marrow derived cells in mice. However with so much experimental work based on rabbit studies it is important to appreciate that the cellular structure of the tonsil is different to the tonsil compared with man. Most surgeons would agree that the tonsil plays a part in building up the immunological competence of the whole body but this probably ceases by the age of 4-5. For this and other reasons it is unwise to recommend tonsillectomy to be undertaken before the age of 4-5 years. It is therefore accepted that the tonsils are not vital, is there evidence to suggest that the patient benefits from their removal in carefully selected cases?

On the grounds of clinical experience alone the answer to this question must be yes — the author has got to meet the parent of parent who has insisted on the removal

stating that the operation was of no value. Properly conducted trials have been carried out by Marlin (1963), Marcus, Adolphson and Evans (1967). To quote the latter — 404 children were selected from ENT outpatient referrals; the sample was those who clinically had experienced evidence for removal of T & A. They were divided into two groups, one of which was operated upon, the other received medical treatment. Both groups were observed for a two year period. The amounts of flaps encountered in the groups was analysed and this showed a statistically significant reduction in one nostril with medical and ENT in the operated group compared with the controls.

Marcus's (1967) conclusions based on a similar study of 404 children were essentially similar except that the reduction in frequency of other nostrils was not statistically significant.

Referral

It is of interest to speculate on the cause for the undoubted regional variation in operation rate. For example in Scotland as a whole in 1967 the rate was 77 per 1 000 in the 5-9 group, 13 per 1 000 in 0-4, and 5.1 per 1 000 up to 15. In both in 1956 26.9% of school leavers had undergone a nasal and/or adeno operation and yet the equivalent figure in St Helens was 8.6% and South Shields 9.9%. To a large extent the variation must depend on the current medical opinion on the area, especially as G.P. and school medical level.

One may ponder as to what the effect of recruitment and replacement of these medical officers will have on the rate of referral to the ENT specialist. There must be differences between GPs in their criteria for ENT referral and it is a personal observation that Doctor X refers many more for possible nasal surgery whereas Dr Y appears to send none at all. The increasing doubts amongst members of the medical profession regarding the long term value of indiscriminate removal of tonsils and

adenoids have been heightened by the referred delays caused by operative waiting lists during which period some children seem to recover completely from their chronic infection state. In the past for too many unnecessary operations have been carried out and this a matter for very careful clinical judgement as to whether a child's problems are really related to an irreversible chronic illness or adenoid pathology or if given time spontaneous remission will take place. Again in the latter controversy is the interesting morbidity, loss of education etc. acceptable? Venters in his review of the background to adenoid tonsillectomy (1974) pointed out the difficulties in achieving a satisfactory evaluation early.

In the ENT clinic the Specialist is faced by a parent or patient who is anxious for long term symptomatic relief. Such a parent has usually received several courses of treatment over many months from the G.P. without lasting benefit. As far as the Specialist is concerned the back steps there and he must offer the parent some solution to his problem after careful clinical evaluation which may require some real chest X-ray, audiometry and pathological investigations of blood plus the histology. It is important that such conditions as glue ear, DNS, chronic sinusitis, chronic nasal foreign body infections and other blood dyscrasias are excluded. Having done so the Specialist is then faced with the alternatives which may be offered to the parent bearing in mind the severity of the symptoms, and in severe persistent and dependent the nature of that disease and possible separation from specialist or even G.P. care. To date the alternatives would seem to be a wait and see policy, knowing that in the long term spontaneous remission may take place. Such a course of action will be difficult to sell to anxious parents in the limited time available in a busy outpatient clinic. Certainly removal of tonsils and adenoids is not the answer in all childhood c/o, of course recurrent colds and flares

to show. However it is well known that in people selected cases the child's health, appetite and weight gain improves dramatically after surgery.

Justification

It may be that properly conducted treatment with an appropriate antibiotic for an adequate period of time will eradicate an apparently chronic nasal infection. There is no doubt in my mind that there is a place for an intensive course of a systemic antibiotic rather than the usually administered oral therapy which for a variety of reasons may not achieve an adequate therapeutic blood level or be continued for a sufficiently long period.

The report of Hanson and Smith (1984) on this subject is of interest and in the present time several trials are under way throughout the world on the efficacy of chemotherapy for bacterial infection. In an attempt to avoid surgery Russian scientists have developed an intensive course but I have no experience of this treatment. In Russia there has been a vogue for penicillin nasal sprays and whilst presumably to clear very distant sinuses the topic. It would seem that this latter technique would be difficult to carry out on a child and more seriously traumatic than a single admission to hospital for nasotomomy. Indeed up over 25 years it has not been my experience (despite reports to the contrary) that children suffer any mental upset as the result of hospital admission for removal of tonsils and adenoids. The apparent absence of this complication is probably due to the excellent modern anaesthesia and nursing care. Some adults still remember the removal of their tonsils as a frightening experience because of having a black mask put over their face and a feeling of suffocation. Supply anaesthesia is no longer induced by such methods in the Royal Naval Hospital, Haslemere.

Criteria for Tonsillectomy and Adenoidectomy

To reach a decision regarding tonsillectomy and/or adenoidectomy the clinician must have at his disposal a list of criteria which he considers important. My own indications are as follows:

- 1 Chronic (peritonsillar) abscess
- 2 Repeated tonsillitis a 3 yearly dose of with/without tons
- 3 Parapharyngeal abscess associated with bacterial infection
- 4 Hypertrophy tonsils associated with dysphagia or obstructive deafness
- 5 Recurrent otitis media associated with rheumatic fever, epilepsy, nephritis
- 6 Unilateral hypertrophy + asplasia — (vascular biopsy)
- 7 Recurrent diphtheria carriers
- 8 Recurrent sore throat associated with abdominal pain (monotonsic adenoids)
- 9 Chronic Vincent's angina
- 10 Tonsillitis associated with epiglottitis fits
- 11 Speech defects — recurrent laryngitis
- 12 Halitosis due to retained debris in tonsil crypts
- 13 Focal sepsis — salivitis, sinusitis, otitis media
- 14 Dysphagia
- 15 Brown TB cervical adenopathy with normal CXR
- 16 Nasal obstruction and mouth breathing
- 17 Underdeveloped mandibulo-maxillary area resulting (garging)
- 18 Recurrent acute otitis media and CSOM
- 19 Glue ear — conductive hearing loss
- 20 Obstructive disease
- 21 Post treatment of recurrent rhinitis

Admittedly some are rarely if ever seen in UK, now, ie recurrent diphtheria carriers and having TB cervical adenopathy. The majority of ENT surgeons would probably agree with these criteria, but it is appreciated that

many practitioners and physicians would not. However, the last two are not faced with such patients in large numbers and personal communication with colleagues in the field tends to provide a generally acceptable compromise.

Contraindications to Operation

At the same time the clinician should also have at his side a list of contraindications to operation, some of which may be controversial, and might include the following:

- a. Haemorrhagic diathesis — thrombophilia, leukaemia, purpura, anaemia.
- b. Ancestral/religious objections.
- c. Polymenorrhea.
- d. Uncomplicated diabetes.
- e. Cervical dysplasia.
- f. Inadequate operation/post-operative facilities.
- g. No communication system Polyspectrum or within 5 weeks of menstruation.
- h. Club palate.
- i. Religious beliefs — Jehovah's Witnesses.
- j. Known possible anaesthetic hazard (certain cell test — malignant hyperpyrexia).

Complications of Surgery

He must also bear in mind possible complications, which may extend a basically unremarkable operation and isolate him against the anticipated benefits. Amongst such complications are scarring of and damage to the soft palate and fauces; pain; damage to the medial ends of the maxillary tubes — damage to teeth etc. There can only be attributed to faults in technique. The possible association of immunology with Hodgkin's disease suggested by Young (1971) has not been confirmed by other workers. It also appears that Hodgkin's disease is far more common in patients who have undergone

apendectomy. The more and well performed complications, a haemorrhage with its attendant morbidity and mortality. By the very nature of the operation a primary postoperative haemorrhage can occur, be frightening to the patient, and extremely dangerous. Regrettably in the past this event occurred was often carried out in the poorest surroundings with no post-operative care of note and no back up laboratory facility. Complications arise up in such circumstances were among the causes of halting the operation and discharge. In no circumstances should tissue and vessels be removed in order that proper hospital surroundings with operation post-operative medical supervision and no laboratory back up. To put some indication of the frequency of serious complications Ford (1970) indicated a questionnaire in 3,647 married GNT specialists in the USA. Their responses spanned 50 years of practice and between them they had carried out 6 175 726 T & A, with a total of 377 deaths. A mortality rate of 0.06%. There were 125 anaesthetic deaths, 127 due to cardiac arrest and 111 due to haemorrhage. It should be remembered that this was some initial surgery carried out as far back as 1930.

In the UK the Office of Population Studies provided the following data on the mortality directly associated with removal of tonsils and adenoids:

1965	280 000	deaths 18
1971	527 000	deaths 6
1972	121 400	deaths 6
1973	140 000	deaths 5

From which it is apparent that the number of operations carried out in the UK is gradually being reduced as the result of more careful selection. In the DR Hospital Hides over the period 1963-1974 5 346 operations were carried out by up to 13 different surgeons. There have been no deaths, no patients were required to return to OT for removal of haemorrhage and four have required blood transfusion. At the

hospital the tendency towards reduction in surgery is also apparent despite a fourfold increase in outpatient referrals. For example, adult tonsillectomy was reduced from 649 during 1946-1950 to 484 during 1955-1956. For the same period children's U & A operations were reduced from 1503 to 1138. However, in response to the increased awareness of childhood diseases due to secondary otitis media, adenoid operations increased from 244 to 717.

Conclusions

In conclusion it must be firmly stated that I am in agreement with most other ENT colleagues in that I would be quite happy to try to carry out smaller tonsillectomy. However, the operation has a place and is undoubtedly beneficial in a number of patients; the question is one of careful selection on a sound clinical basis including parental pressures, financial arrangements and other considerations which have been the cause of leaving T & A until discharge.

Adenoidectomy associated with myringotomy has a very important place in

the treatment of childhood secondary otitis media (Page 1877).

References

- MARGENIUS, L. B., HILGERTSON, T., SVANE, M. (1951) A controlled study comparing of cases treated by an ENT. *Journal of Otorhinolaryngology and Otolaryngology*, **63**, 157-171.
- MARSH, W. J. (1942) Controlled study of effects of U & A in children. *British Journal of Otorhinology and Laryngology*, **45**, 37.
- PRATT, W. LORING (1956) T & A, tonsillectomy and adenoidectomy. *Transactions of the American Academy of Otolaryngology and Otorhinolaryngology*, **78**, 1158.
- SHAFER, J. (1955) *General Otorhinology*. T. B. S. Appleton, New York (Penguin Medical, 5s).
- STILLER, L. (1952) Tonsillectomy and the otoneurological state of the child. *Ann. otolaryngology*, **61**, 220.
- YATES, E. J., BRIDGEMAN, T., FLEMING, H. C. (1955) Otorhinolaryngeal features of tonsils treated with special reference to U & A. *British Journal of Otorhinology and Laryngology*, **58**, 26-33.
- YATES, E. J., BRIDGEMAN, H. C., KELLEN, F. H., FLEMING, H. C. (1957) Laryngotomographic changes in a paediatric patient, subsequent to T & A. *Journal of Otorhinology and Laryngology*, **60**, 768.
- YOUNG, C. J. (1955) Tonsillectomy and T & A. *British Journal of Otorhinology and Laryngology*, **58**, 274.
- YOUNG, C. J., GREENWALD, F., BAYNE, J. B. (1955) Tonsillectomy and Politzer's Dacryo-Tympanostomy. *British Journal of Otorhinology and Laryngology*, **58**, 267-269.

Globus Hystericus and Cervical Osteophytes

B. T. Cooper

ABSTRACT

Globus hystericus is an unpleasant name, its use and most descriptive diagnosis in the literature is outdated. The pathophysiology is poor, due to our increasing knowledge the diagnosis becomes more the emphasis is placed upon cervical osteophytes as a not uncommon cause.

Introduction

Globus hystericus has been a controversial label for a large group of undiagnosed pharyngeal-oesophageal symptoms for many years. A review of the past theories and the present state of our understanding, related to *globus hystericus* is presented with an emphasis on cervical osteophytes as seen in the ENT Department, BN Hospital, Harlow, in the past year.

Definition

Globus hystericus is a common complaint seen mostly in women, classically middle-aged and unmarried. There is a sensation of a lump in the throat and a desire to swallow to dislodge the lump. The sensation is usually situated at the level of the thyroid cartilage. The symptom fluctuates and is usually present when the patient is tired, nervous or worried. A relation to food may have died of cause of the throat. In this article strict adherence to the title of *globus hystericus* is employed, there being no dysphagia and usually the symptoms improved by taking a meal or drink.

Aetiology

The label *hystericus* has aetiological implications but is with many so called functional complaints, the convenient

placeholder decreases with clinical diligence and research. It has been suggested that the name be changed to *pharynx* (Malcolmson 1966) to avoid these connotations.

Many areas of the head and neck have been suggested as causative factors enlargement of lingual tonsils (Tremble 1956) and granular pharyngitis (Logan Turner 1953) have been linked as potential aetiological factors. Hypothyroidism has been found in four unrelated *globus* symptoms on occasions (Hewy 1958) and mandibular osteitis, even though growth function was negative in 40 per cent of cases (Mills 1956). The Potters-Gilman-Kelly syndrome with subsequent oesophagus is known to all and it has been suggested that reflux oesodysmoty without oesophagus is important (Miyake and Motomaki 1970).

Cricopharyngeal spasm has been postulated as an attractive diagnosis (Lindsay 1955) but recent pressure in the oesophagus has not been confirmed. In fact the cricopharyngeal contraction pressure was found to be lower in *globus* patients than in a control group (Goldsmith *et al.* 1970).

Malcolmson (1966) studied 267 patients and found 34 per cent with hiatus hernia and 13.7 per cent extra with various gastric and duodenal lesions.

Miller *et al.* (1971) investigated a series of 77 patients with a lump in the throat. Sliding hiatus hernia, positive and histomicroscopic and various pathological conditions,

in the stomach and duodenum were found in 47 per cent. After two years follow up, it was concluded that reflux haem. haem. was a distal histological factor. They recommended caution in recommending haem. haem. with a causal relationship for pharyngeal symptoms alone, particularly in the absence of definite endoscopic evidence of reflux.

Friedland *et al.* (1934) followed 124 patients with the symptom for six months to three years and found 90 with acid sensitivity of the oesophagus and the remaining 34 had haem. haem. It was also stated that the presence of cervical oesophagus was an incidental radiological finding in a few patients and may have been partly responsible for the symptoms.

Cervical oesophagus as a possible factor are usually diagnosed and when quoted are given as a cause for dysphagia not a lump (Fig. 1).



Fig. 1. Cervical oesophagus, showing distension of the oesophagus (Friedland *et al.*).

Cervical Oesophagus

John (1900) described the condition sometime before the two cases of Mincher (1934).

Boze (1931) described haem. reaction (pharyngitis and parathyroiditis) involving oesophagus and felt that the inflammation produced the pharyngeal sensation (Fig. 2).

Swanson (1970) described two cases of dysphagia not with associated oesophageal compression and another two cases. One patient had the oesophagus removed via a lateral neck incision and the symptoms improved for six months.

Moran and Jacobson (1971) described a case of "a feeling of a mass in the throat, relieved by the removal of a cervical oesophagus by lateral approach with biopsy of the cervical spine. It was felt that since the symptoms could be caused by oesophagus, that such an operation was



Fig. 2. Cervical oesophagus, showing distension of the oesophagus (Boze).

Import

For dyophrags to occur, then, the oesophagus must be C6 or below to enclose the diaphragm. Any cervical vertebra below C7 will produce a constriction of a lamp in the throat if an anterior oesophagus is present of sufficient size to enclose the oesophagus on both sides.

Examples

Using the strict criteria of global hypoxia as noted above, it was found that in our department with an important turnover of nearly 6,000 fish each year, there were only 10 cases. All other dyophrags had an obvious diaphragm usually made of barium swallow.

		Air Age	Sex
Oesophagus only	8	56 yrs	4F/2M
No abnormality	5	12-4	1F/4M

Obviously these figures are of no statistical relevance. They do, however, agree to further age is concerned with the sex ratio noted by Moran and Doreless (1971) who having sampled the fish stock found 31 males out of 45 and the average age to be 34 years.

The following case history is of interest especially in relation to the already mentioned theory of Baser (1953) who felt that the post-diaphragmatic esophagus produces flexion and adhesion, thus fixation of the gills proved normal at gill movement. B. (196) a retired fleet admiral presented with a two year history of a feeling of constriction in the upper throat. There was no dyophragm. He was a very heavy pipe smoker and his father had died of cancer of the diaphragm. Barium swallow in 1966 was reported as normal. On examination he was found to be a fit well preserved man with no obvious abnormalities. Barium studies showed a constriction (filling defect) on the left of the oesophagus posteriorly at C6/7. Oesophagotomy was performed owing to the oesophagus at lapping producing mucous secretions and subsequent cough movements (fig. 3).



Fig. 3. Mass tumour, 4.5x2.5x1.5 cm, adjacent to the oesophagus in situ.

By a left transverse approach, large oesophagies were removed at C6/5, C6/6 and C6/7. This allowed further oesophagotomy to be completed and extensive fibrosis was found in the post-cervical posterior base region related to the area of oesophageal protrusion. Following operation, the original complaint of a lump disappeared. A well differentiated squamous cell carcinoma was reported and the subsequently unfavourable local investigation when a carcinoma was found directly opposite the oesophagus (fig. 4).

It is interesting to speculate whether there is a connection between the malignancy and the oesophagus following on the thoughts of Baser (1953).

Discussion

In assessing these patients, the average degree of oesophagotomy must not be forgotten. Jordan and Turner (1966) showed that cervical oesophagies were a factor in 75

War Casualties in Oman — A Limited Experience

J. G. Seal

Introduction

RAF Salalah was in the Dhofar province of Oman. The base was run by the Royal Air Force but encompassed the Headquarters Dhofar Brigade (QdF) and Headquarters Sultan of Oman's Air Force (SOAF). The Army and Royal Air Force have alternated in providing a regular support team for five months twice a duty. In September 1975 an Army Field Sengul Team (FST) was the permanent base as Sergeant was in called and I departed for home in the month of October, the first Royal Navy Sergeant to be appointed to RAF Salalah.

Back-Of-the-Scenerio

There is an agreement, but protected war between the Omani Government and the Popular Front for the Liberation of Oman and the Arabian Gulf. In 1968 the present Sultan Qaboos bin Said succeeded his father who for 28 years previously had been an exilesman, rejecting 19th Century culture and advances. In the aftermath of the new Sultan there were many socio-political changes in the country among which was the abolition of slavery. Money received from the sale of crude oil was used for the improvement of industry and the provision of advanced medical and educational services in Oman, particularly in the province of Dhofar. Terrorists have infiltrated into the province and are known locally as *Ados*. The war officially finished in 1975/76 but there are still scattered successes by the terrorists into the

province of Dhofar in attempting to make their way up to the North East of the country. The numbers of *Ados* at present active in Dhofar are thought to be in tens rather than hundreds.

The problems that arise as a result of the war and as a result of the presence of the *Ados* terrorists are:

- 1 isolated skirmishes between border patrols from the Yemen and border patrols from the Sultan of Oman's Forces;
- 2 occasional *Ados* contact throughout Dhofar province mainly in the forest mountains;
- 3 the presence of a large number of unpersonnel mines planted during the war at yet unknown and to a large extent uncharted;
- 4 road traffic accidents involving vehicles and personnel of the Sultan of Oman's Forces, mainly Omani;
- 5 isolated accidental exchanges from weapons, bombs and routine general practice.

This is the social and political environment in which the FST has been imposed and within which it is working.

The Field Sengul Team

The FST occupies a small complex of buildings within the Royal Air Force Camp. It comprises a helicopter landing pad, a communication room, 3 wards, a CMO laboratory X-ray and theatre. There is in addition an administration block and

surviving notes which include treatment notes and diagnosis. The Mortuary was a refrigerated bulk container.

The personnel attached to the Field Hospital Team was one surgeon, eight or ten medics, who also was qualified as physician, and a dentist who doubled as a second consultant. There was also a team of 15 other ranks from the same very similar to our own Sergeant Support Team in the Bay.

The patients we treated fell into 3 main categories. Firstly battle casualties which were received by helicopter to the hospital and usually from the front mountains. In this category I also include Servicemen who were injured as a result of accidental discharge of weapons and road traffic accidents involving Service vehicles. Secondly treated personnel included all the personnel on the Royal Air Force Camp from Sultan's Armed Forces, Sultan of Oman's Air Force and the Royal Air Force. Thirdly, there were so-called non-combat personnel. These included all the contract civilians such as Taylor-Woodrow, other civilian firms, and local Omanis who preferred to come to the FST for treatment of their minor complaints rather than attend the local Salalah civilian hospital.

Salalah Hospital, in the town of Salalah, was run by 15 Irish or Sargons and 2 English physicians who provided a first service for Omanis civilians. They were greatly overworked and their equipment was minimal. Each of the doctors saw at least 100 outpatients per day. There is a new civilian hospital being built now in the town of Salalah which will have up to 200 beds and vastly improved facilities.

Additional medical facilities were provided for the Military personnel at the, Um Al Gai and Military Camp. This was the Headquarters of the Desert Regiment Sultan's Armed Forces, and contained a Military Hospital to which the Surgeon to the FST was visiting. Sergeant Adams. There were no surgical facilities at this

Military Hospital but they undertook the post-operative care for all surgeons from Sultan's Armed Forces. The FST Surgeon visited the Um Al-Gai Military Hospital twice a week and did a ward round on all surgical patients in company with the second doctor from the Indian Navy who looked after the patients.

Equipment

All equipment used by the FST within the complex was the standard equipment used by any Sergeant Support Team. In case of the fact that the FST had been in RAF Salalah for a number of years and was now housed in buildings rather than tents, a certain amount of equipment had been added to the basic equipment to make life more comfortable from the climate point of view.

Early comprehensive X-ray and laboratory facilities were available and comprehensive both radiological and pathological could be carried out provided that they were within the scope of the techniques accepted in the FST.

The only commodity not really available was blood. This was, in its words, "on the hoof". If blood was required in an emergency for a major casualty the requirement for the blood group was broadcast on Radio 29, the local radio station. This was operated from within the Royal Air Force Camp at Salalah but was picked up by all local stations so the medium was loud. In our experience it was broadcast the need for a certain group of blood at least 20 times would attend with in 10 minutes. They would be immediately told and group compatible blood was almost available for transfusion within 10 minutes of our broadcast.

Case Report 1

A 27 year old Iranian Corporal was brought to the FST 35 minutes after receiving a gun shot wound to the thorax anteriorly at his right hand. The wound had

been caused by an accidental discharge from a semi-automatic rifle.

On examination there was a contused entry wound over the distal end of the right hand, with both proximal and distal ends of the first metacarpal visible. The metacarpal itself was shattered. There was considerable muscle and skin loss. The wound was not bleeding noticeably.

An operation under a general anesthetic the wound was explored; the bone fragments were removed and the wound was debrided. All that remained following debridement was the proximal end of the first metacarpal; the remainder of the metacarpal with its head having been missed. The wound was packed with a Chlorox pack (transmucron 1 or 200) and a pressure dressing applied.

This man was returned home to Britain before any secondary infection could be observed.

Case Report 2

A 29 year old Iranian Sergeant was brought to the FST on the same evening as that in Case Number 1. He had been injured in the same accidental discharge. The bullet from the G3 semi-automatic weapon having passed through his Corporal's thumb and then on through the Sergeant's right forearm. He had received no analgesia and a tourniquet had been applied to control the bleeding.

On arrival again, he had a grossly lacerated forearm; examination of which was difficult due to pain. The wound was bleeding profusely and after releasing the tourniquet for 2 or 3 minutes a blood pressure cuff was applied to his right arm. A pressure of 100 millimetres of mercury was applied to the cuff which controlled the bleeding satisfactorily. His pulse rate was 120 beats per minute; his blood pressure 90/60. An intravenous infusion was set up and he was rehydrated using both crystalloid and

colloid solution. Blood was taken for urine tests.

An operation under a general anesthetic shortly after admission, in operation revealed that the lower end of his right forearm had been shattered and there were only odd fragments of bone between his elbow, joint and approximately 7cm of radius and ulna extending from the wrist joint proximally. It was not possible to determine which had been the entry and which the exit wound (Fig. 1). Debridement of the wound was carried out following that there was no viable muscle left in the forearm. His right forearm was amputated, retaining the lower end of the humerus. Equilateral anterior and posterior flaps were fashioned and the wound was packed with a Chlorox pack. A pressure dressing was applied to the stump. The patient required 3 units of whole blood during the course of the operation.



Fig. 1. Case 2. Amputation—(1, 2, 3, 4, 5, 6).

Four days later under general anaesthesia the dressing was removed and the stump inspected. There was no gangrenous or debrided muscle but some of the posterior skin flap appeared non viable. Nerves and vessels were approximated across the end of the humerus and the skin flaps were brought in view of the debridement required at the skin flaps; the wound was not closed but again packed. A pressure dressing was applied.

Two days later this man was flown back to Takhli in the definite emergency.

Case Report 3

On the evening of 17/10/75 a Vietnamese Staff Sergeant of the Frontier Force Battalion Armed Forces was brought in the FST by helicopter 40 minutes after stopping on an anti-personnel mine.

On admission he was shocked with a pulse in excess of 140 and a non-recountable blood pressure. His immediate obvious injuries were:

- 1 traumatic amputation of his left foot
- 2 massive lower lacer to the lateral and posterior aspects of his leg
- 3 deep lacer and blunt injury to his left arm

Arterial tourniquets were applied to the three damaged limbs and fresh blood was given *in situ*. After a short period of resuscitation under a general anaesthetic all wounds were debrided and a left below knee stump fashioned. All devascularized muscle was excised and the skin flaps were loosely closed around a Chlora pack.

This man required a total operating time of 7 hours.

Case Report 4

On the 18/10/75 at 0500 the Second in Command of Frontier Force Battalion Armed Forces was contacted by helicopter in the FST approximately 40 minutes after stopping on an anti-personnel mine. A superficial examination on admission showed him to be grossly shocked. He was semi-conscious, sweating, extremely pale, a blood pressure of 70/50 and a pulse of 140.

His significant eye injuries were:

- 1 traumatic amputation of the right leg
- 2 comminuted compound fracture of the right tibia/fibula with bone loss
- 3 massive lower lacer around his perineum and groin
- 4 blunt eye trauma to his right and eyes
- 5 postcervical lacer to his left hand

4 blunt wounds to the posterior aspect of his left leg

Tourniquets were set up and an attempt was made to resuscitate him. Unfortunately the nature of his injuries were such that he was bleeding faster than it was possible to replace lost blood. In spite of large quantities of intravenous fluid, no improvement was seen in his peristalsis and it was decided that an anaesthetic was required to stop the man's bleeding.

As questions on emergency general anaesthesia were administered and a right thigh bone amputation was carried out (fig 2). The wounds of his right leg, right arm, left hand and left leg were dressed with pressure dressings in order to control the haemorrhage and no further operative procedure was carried out for about 30 minutes whilst resuscitation continued. In 30 minutes 4 pints of fresh blood was administered together with some crystalloid solution. At the end of this period his pulse was 100 beats per minute. Blood pressure 120/70. It was considered at this stage safe to continue with the operative procedures necessary.



Fig 2 Case 4. Right leg after emergency above knee amputation.

The wounds to his right leg were extensively debrided and at the end of this procedure the tibia had to be debrided at the mid shaft level. Large Chlora packs

were applied to the rest of his stump and pressure was applied to the stump.

The wound to his right forearm was extensively contaminated with dirt, sand, clothing and fragments of explosive charge. The wound was fully debrided and the fracture reduced. A Chlorin pack was superimposed, the large ends of bandage tied and a plaster of paris back slab was applied to his right forearm.

This man had received the full effect of the blast from the gas personnel being in his line. He had multiple lacerations and puncture wounds and his clothes appeared opaque. Thorough toilet was carried out on all the puncture wounds and lacerations which were then sutured. Homatropine and Sedrolin eye drops were applied to both eyes which were then covered with sterile pads.

The patient had also received full blast

from the mine and his stomach had been completely debrided. The intestinal capsule was present on both sides as was the sigmoidum but no vascular tissue could be found. The colon has extended into his right groin and the right superficial inguinal ring was exposed. The penis was debrided. The external urinary duct was visible and indeed it had been possible at the beginning of this procedure to pass a catheter into the bladder from which clear urine had been drained. An attempt was made to reconstruct the penis with as little debridement as possible.

Full debridement was however carried out on his perineum and groin and the wounds were then packed with a Chlorin soaked pad.

Extensive toilet of wound was carried out in the perineum, a wash on his left hand and his face with the effluent.



Fig. 2. Case 1. Photocell aspect of lighting before and during debridement.

The whole of the posterior aspect of his left leg was covered with multiple punctate wounds, containing grey clots, and deepened. There was extensive skin loss from his left popliteal fossa and this was extensively debrided (Fig 3). The targe of the holes were fully debrided and the debris, and dead muscle were removed. The multiple smaller holes were scrubbed with aqueous betadine. From a large hole in his left buttock the head of a DMS bolt was retrieved. The wounds that produced by debridement and clot were dressed.

In all the man underwent a 7 hour general anaesthetic and was transfused 17 units of whole blood. Forty eight hours after his arrival he arrived at Queen Mary's Hospital, Roehampton where further surgery (debridement and debridement) was being carried out.

Case Report 2

On the 27th of 76 a Royal Regiment of Cavalry stopped in shooting a man that was accompanied by helicopter to the PST approximately 25 minutes after stopping on its side protected man.

On arrival the man was unconscious. He was not shocked. He had a good blood pressure and his pulse was within normal limits. Superficial examination revealed that he had a traumatic amputation of the right foot with multiple punctate marks and wound bleeding in the posterior aspect of his left leg.

At operation later under a general anaesthetic the wound in the lower end of his right leg was explored. The foot had been completely debrided. The tibia and fibula were intact in their entire length. There was considerable muscle damage extending up to the joint line of the middle and lower third of the right leg and even though it was possible to palpate foreign bodies in the muscle planes a full 18 cm higher than that level. The tibia and fibula

were divided 15 cm above the middle joint and the wound packed with a Chloraz pack. A pressure dressing was applied to the stump.

The posterior aspect of his left leg was scrubbed to remove as much sand as possible and the multiple punctate marks were dressed.

Four days later under a general anaesthetic the wound in his right leg was explored. Considerable debrided muscle was found which required further debridement and further amputation of his tibia and fibula was carried out at a level 12 cm below the right distal tubercle. In view of the extensive debridement which had been carried out at the second operation the wound was not sutured but closed loosely around a pack and a pressure dressing applied. The punctate wounds in the posterior aspect of his left leg were redressed and although some suppuration had taken place in some of the larger punctate marks the wounds were on the whole clean.

Forty eight hours later the man arrived in England.

Discussion

During the 3 weeks that I was in Oman we treated 18 cases and many more minor cases. Five of the major cases have been described in this paper. From that the major contribution has around the number of bullet wounds being received by the PST is very small. During the war in Oman greater number of patients were dealt with by the PST and a full 4 months map of duty has been described by Melrose, Farver & Walker (1975).

During the limited tour of duty in Oman no battle casualties died. This was due to two main factors. The first was the relatively small numbers of casualties received by the PST and secondly the casualties tended to arrive singly rather than in greater concentrations. Most casualties arrived together in greater numbers, seriously woun

patients would have died whilst awaiting treatment.

Cases 3 and 4 both required massive resuscitation which was not possible without immediately bringing of the patient to their wounds and the inability to achieve haemostasis without providing sufficient analgesia. It is unlikely in all surgical teaching that a patient should be given an anaesthetic prior to resuscitation and yet one of both of these men would undoubtedly have died had this principle not been ignored. Brown & Jones (1976) describing a similar situation in Aden in April 1967 recorded a decrease in the total resuscitation time in emergency campaigns. In World War II the average resuscitation time was five to five hours, and in Korea three hours. In Aden and later in Vietnam the average resuscitation time was one and a half to two hours, similar to that which we experienced in Oman. The main element cited of failure to respond to resuscitative measures was continued uncontrolled haemorrhage rather than fluid stores.

Both cases 3 and 4 required extensive operative treatment and long anaesthesia. Eleven hours of operating time on two casualties would not be acceptable in a full blown war situation when there may be many other casualties requiring operative treatment. It is likely that one or even both of these men would have died. Indeed case 4 would have been classified priority 4 and put in one safe, only requiring operative treatment after all other casualties had been dealt with.

The time taken to transport a casualty from the scene of his wounding to the Field Surgical Team in Oman was about 35 minutes. This rapid transit time from wounding to resuscitation also contributes to a low mortality figure. Experience has shown that mortality is proportional to the

length of time taken to transport casualties from the scene of their injury to an adequately equipped surgical support team. The dramatic decrease in mortality in Vietnam compared with previous campaigns as reported by Whitaker, Burkholder & Gosses (1966) has been almost exclusively due to the use of helicopters for casualty evacuation.

The surgical treatment of wounds requires has been described at length by many authors. Primary debridement, leaving the wounds open or mandatory delayed closure or packing wounds only, be carried out in the absence of infection. Unfortunately history shows that this lesson has to be learned again at each successive campaign (Watt 1974).

The experience which I gained in Salsalah on war surgery was extremely valuable, particularly in view of the fact that Royal Naval Surgical Support Teams are not involved in a theatre of operations such as the war in Oman. My only regret was that the experience was limited and had I been in Oman with the FST during the war the experience would have been even more valuable. It is essential that despite these clinical commitments in hospital more Royal Naval Medical Officers should ensure this valuable practical experience at war surgery whenever it is available in a theatre war situation.

References

- BROWN, J. & JONES, J. (1976) Major operations since 1945. In *Text of American Surgeon* 2 (2), 106.
- BRIDGEMAN, A., FARRARIN, D. & VOLKMER, L. (1974) *British Casualties: A Study of the Effect of Surgery on Woundings*, 200-204.
- WATT, M. (1974) *War Surgery*. London: Baillière Tindall.
- WHITAKER, T. & BURKHOLDER, W. & GOSS, G. (1966) *Management of War Wounds*. Advances in Surgery. Chicago: The Year Medical Publishers, Ltd.

The Use of Computer Assisted Data Processing and Display Methods in Brain Scintigraphy.

A. S. Houston

ABSTRACT

Methods have been published recently on the speed of data processing and display methods in nuclear medicine scintigraphy. The main theme has been a move towards faster evaluation of the technique being a procedure which combines clinical significance and patient's interests. In this paper the rapidly changing scene is defined and sets out for each these studies the paper discusses these studies performance.

Introduction

When computers are used to process and display images, it is imperative that correct use is made of this facility. Such is the case in nuclear medicine where, if allowed to go unchecked, prejudice will play the major role. When applied to image displays "best" has often come to mean "most aesthetically pleasing" and not necessarily that which produces the greatest patient benefit. This theme has been developed by Metz, Kave and Lusted (1976) who use the concept of receiver operating characteristic (ROC) curves to compare system and observer performance.

The observer must first of all be armed to recognise a pattern which is defined as "normal". This pattern should contain variables which allow it to change but remain within this definition. A defect if it is well defined and may then be introduced into this pattern which is then defined as "abnormal". The observer is then given a series of patterns which may be "normal" or "abnormal" and asked to grade them into several, (increasingly) fast computer ratings from "defect almost definitely present" to "defect almost definitely not present". By plotting the percentage of true positive detections against the percentage of "false

positive" detections for each rating, the experimenter obtains an ROC curve which may be used to judge the performance of both observer and display.

The theory of ROC curves has been developed so that the observer's ability to locate a lesion may be assessed.

A major problem when applying this method to displays in nuclear medicine is combining clinical relevance with absolute knowledge of the true state.

When clinical data are used "truth" can only be established by biopsy, autopsy or clinical follow up. The latter is usually adopted as necessary in order to give a statistically significant sample. However it follows up reveals the "true situation is positive" parameters such as location, size, contrast etc. are still not readily available.

When phantom data are used clinical relevance is severely at issue. A major concern is that no proper anatomical structure is present in the views presented.

A compromise which has been suggested is that computer simulated "mathematical" lesions be superimposed on clinically normal images (Houston, 1976).

Method of Comparison

Several computer assisted data processing and display methods were compared using a series of 200 normal human scintigrams 10% of which had been detected by the addition of single spherical mathematical lesions (Houston, 1976a) (Houston and Medford, 1977).

Points were awarded for each method using a particular interpretation of the appropriate ROC curve. The methods and displays were divided into categories and those which performed best in each are described in this paper.

Processing/Display Methods

In order to set a base line, the simplest form of permanent display available with a Varian 620 L/100 microcomputer is shown in Fig. 1. This consists of *Statis* output of raw data with various levels of grey and a background substrate of 10 per cent. Although the screen is obvious in this instance, this particular display only rated 4 points, which was not to be compared with the best in each category.



Fig. 1. Simple *Statis* display of raw data.

Raw data display

It was found that if the levels of grey were cycled three times as shown in Fig. 2 the observer's performance increased considerably producing a score of 37 points.

Non-point smoothed data display

The simplest form of data processing is smoothing. Here a non-point smoothing with weights 4, 7 and 1 was applied and various displays of the processed data compared. The best was an immediate display (Fig. 3) on a Tektronix 401 storage



Fig. 2. Raw data with cycled grey levels (37 points).



Fig. 3. Immediate display of non-point smoothed data (37 points). The grey with the background is 10 per cent, the grey without the background is 40 per cent.

display was producing a score of 36 points.

Other smoothing methods

Numerous other smoothing methods were compared using only the simple *Statis* display described at the beginning of this section. When a method first (e.g. Radix and Kayser's (1982)) was used, i.e. a filter which is designed to match the point spread function of the imaging device, a rating of 37 points was achieved. Fig. 4 shows the appropriate display.



Fig. 4. Simple binary display of simulated filtered data.

Refocusing and focus

Several processing methods which attempt to correct for the blurring effect of the imaging device were compared again using only the simulated filterless display. One particularly well designed filter, the optimal filter (Tanaka and Kawan, 1976) registered a total of 36 points. The filtered view is shown in fig 5.

Other image enhancement/enrichment techniques

These methods attempt to enhance the



Fig. 5. Simple binary display of filtered simulated data.

data beyond the requirements of recording and playback in the final display of course. The first method in this category was a grey scale signal component version of the step filter with a score of 29 points. However, another technique, which performed almost as well scoring 30 points, was the Canterbury filter (Canfield, 1970) which is displayed in fig 6 in preference to the step filter, since the latter obscures top of the vascular system. The Canterbury filter is based on the optical technique of 'threshold marking'.



Fig. 6. Simple binary display with 8% background reduction of Canfield amplification.

Quantitative methods

The method which scored highest with 41 points was quantitation of difference (Morris, Bacht and Britton, 1974). Lesions are first of all detected using the Canterbury filter. Displays of the original data were smoothed and generated with various cut-off contrast values (fig. 7) until it is judged that the contrast would have passed through the target region had the subject been normal. This is defined as the expected value, which is then compared with the observed value and the percent age difference calculated.

Structural methods

The standard step filter (Blissman, 1970, 1973a) which produces a signal to select



Fig. 7. Computer display for representation of difference. Expected value = 100. Observed value = 110. Difference = 10%.

value at each point of the display (Fig. 8) was best in this respect with a score of 39 points, while immediately next the same score of the grey scale version of the filter mentioned earlier.

Discussion

In all 33 different methods were compared and produced scores ranging from 40 to 46. These scores are of course relative to the observer so it was necessary in order that the scores could be put to use that the observer was the consultant who does all routine reporting in the department.

The outcome of the survey are such that a difference of a few points is not significant. As a result it is difficult to separate the five methods with scores of 39 or over.



Fig. 8. Computer display of grey filtered data.

The results, showing the best methods with possible faults, are summarized in table 3.

Conclusions

In the past in the Department of Nuclear Medicine, RNN Hadar, all static breast reporting has been based on the analogue display on X-ray film. For the past eight or months the statistical strip *after* has been used routinely in all breast examinations and has been found to be particularly useful for sequential cases. Nothing in this study suggests that any alteration in the system is necessary, although in certain exceptional

cases 'quantitation of difference' is now also performed.

References

- BAKSHI M, J C, EDELL T, and BRITTON A B (1976) The quantitation of difference in radiography using an analogue display system. (2) *Quantitative Darstellung der Qualität für Nuklearmedizin 2*. (Thieme-Verlag).
- CHODURA L B (1975) *Development of two image enhancement techniques for static breast radiography: the Quantitation of Difference for Nuklearmedizin 2*. (Thieme-Verlag).
- BRITTON A B (1976) Mathematical aspects and their use in examining film processing techniques in radiography. *Proceedings, Physics in Medicine and Biology* 21, 101-102.
- BRITTON A B (1975) The strip film and its use in radiographic radiography. (2) *Quantitative Darstellung der Qualität für Nuklearmedizin 2*. (Thieme-Verlag).
- BRITTON A B (1976a) An intercomparison of three quantitation data provided by different using automatic image analysis. *Ann. Nuclear Energy* (Plasma Physics) 21, 1009-1010.
- BRITTON A B (1976b) The interpretation of strip film images acquired from computer. *Journal of the Royal Society of Medical Sciences* 82, 11-15.
- BRITTON A B, and EDELL T, and M. J. (1977) An analogue strip film of sequential breast static radiography and digital display in radiographic radiography using mathematical difference. To be published. *Physics in Medicine and Biology*.
- DELL T, and EDELL T, and BRITTON A B (1976) Quantitative evaluation of method using *MAA* computer in Medical Radiology. *Ann. Nuclear Energy* (Plasma Physics) 21, 1011-1012.
- DELL T, and EDELL T, and BRITTON A B (1976) Application of optical data processing in radiographic radiography. *Physics in Medicine and Biology* 21, 1013-1014.
- DELL T, and EDELL T, and BRITTON A B (1976) Optimum filter for the detection of signals in noise. *Proceedings of the IEEE* 64, 1025-1026.

Assessment of Renal Function Using ^{99m}Tc — DTPA (S_m)

M. A. Mackay

ABSTRACT

Following the injection of ^{99m}Tc DTPA — (S_m) the 1,000 raw data are collected using a gamma camera and computer. Between 40 and 400 frames are displayed on a video screen, and these may be put in quantitative display of renal uptake and excretion of tracer, and demonstrate the renal parenchyma and collecting system. Computerized processing of the raw produces outlined areas/variables (area/pl) and helps, subsequently, the glomerular/plasma rate of clearance using an outlined area counting technique. Combining the renal parenchyma and dynamic excretion of the renal parenchyma and collecting systems add a quantitative assessment of renal function.

Introduction

Until the advent of computer assisted processing of data collected during renal angiography, assessment of renal function involved a complex variety of qualitative and quantitative methods of investigation. Morphological irregularities in renal parenchymal and collecting systems were demonstrated by IVP, intravenous pyelography, arteriography, and scanning or scintigraphy angiography and ultra sound. Attempts at quantitative examination involved measurement of the clearance of pyrenine, inulin or thiodol radiotracers from the plasma by collecting blood and urine samples at given intervals. All of these qualitative and quantitative procedures are invasive, require separate assessment and involve patient time and discomfort.

Ideally a method is desirable which results in a combined qualitative (morphological) and quantitative assessment of renal function, following the administration of a single radio pharmaceutical and which needs only a

short examination time with no further patient discomfort or separate investigation. This paper outlines such a method, developed in the Department of Nuclear Medicine, HM Hospital Haile. It requires only a single injection of ^{99m}Tc DTPA (S_m) the collection of data for 1,000 seconds and the subsequent measurement of glomerular/plasma rate by outlined area counting (Mackay, Sampson & Howson 1976, 1977).

Materials and Methods

Following the injection of 1 mCi ^{99m}Tc DTPA (S_m) into the patient in the sitting position in front of a Nuclear Chicago NP-10 gamma camera using a drawing reference (Fig. 1) 1,000 raw data are collected using a Yanco 550-A 100 computer. Subsequently 16 x 16 sec frames are displayed as hard copy on Yanco grey scale video paper. Reports of routine are



Fig. 1

drawn around each kidney outline, displayed on the Tektronix 411 storage display oscilloscope (Fig. 3) and the information collected inside



Fig. 1

each region is displayed in a combined uptake (static) and (activity) curve of 30 x 30 sec. frames for each kidney (Fig. 2)



Fig. 2

One hour later each patient has a 30 sec renal scan performed at 10 minute intervals on a shielded, large volume chamber (Fig. 4) with surface probe (usually 6.50) are observed to draw the parent's biological half-life (T_{1/2}) curve for ^{99m}Tc DTPA. (Fig. 3)



Fig. 3

Results

A qualitative display of the renal parenchyma and collecting system is provided by the dynamic mode by 30 x 60 sec frames (Fig. 5) displayed on Tektronix paper. Further views are obtained by examining the first 8 frames, the second 8 frames and all 16 frames (Fig. 6). In this way any morphological irregularities can be noted (Fig. 7). Of special importance is the differentiation between hypertension and



Fig. 4



Fig 5



Fig 7

a cyst is the study of the first 3 frames where the vascular hyperaephoria will exhibit an initial 'hot' flash before becoming a cold area. A cystic lesion remains cold throughout. Activity/time curves (integrated of 50 x 20 sec frames for each kidney) are always studied in relation to the morphological appearance. They exhibit two phases: (a) an uptake phase, where the diastole is momentarily held in the renal parenchyma during glomerular filtration and (b) an excretory phase, where the

diastole is passed through the collecting system into the ureters and bladder (Fig 7). Lesions affecting the kidney parenchyma and/or collecting system are displayed as abnormalities in the shape and amplitude of the activity/time curve (Fig 6).



Fig 6

Biological half-life curves, obtained after subsequent voiding, are a measure of renal efficiency in that the slope of the curve is directly related to the glomerular filtration rate (Mischak, Sampson & Houston 1977). The results can be expressed as the T_{1/2} (in minutes) or glomerular filtration rate in ml/min (Fig 8).

Discussion

Renal excretion of ^{99m}Tc DTPA (Sc) is affected by glomerular filtration and about



Fig 8

Ambient Pressure Effects on Atmospheric Oxygen Levels in Patrol Submarines

E. J. Jolly

ABSTRACT

This article describes a submarine and also demonstrates the importance of considering ambient pressure in a closed plastic (submarine) when determining submerged time allowed before consuming oxygen generators.

Summary

Atmosphere control on a patrol — conventional diesel electric — submarine (SSK) relies upon measurements of atmospheric carbon dioxide and operation of intergenerative oxygen producing candles and carbon dioxide absorbent canisters. Factors for oxygen generation and carbon dioxide absorption are determined by the interrelation of the floodable volume of the submarine, the number of crew carried and the losses submerged.

A trial carried out in 1975 on HMS Ocean using modern atmosphere analysis equipment demonstrated the importance of taking submarine ambient pressure into consideration when calculating submerged endurance before consuming oxygen generators, and confirmed earlier findings from earlier trials in HMS Conquer and Oyster.

Introduction

The ability to overcharge is the main reason an SSK's main diesel generators, or recovery mechanical efficiency; however, their use while the submarine is strongly results in a lowering of the ambient pressure in the submarine compared with atmosphere at sea level. Lowering the ambient pressure inside the submarine (logically, drawing a vacuum) results

from atmospheric leakage (the demands of the diesel generators for air on the one hand and the capacity of the air induction system on the other).

This problem is not confined to the diesel starting submarine. It is critical practice to start while on surface passages because the major submarine control systems are tied beneath the conning tower hatch and in order to maintain the availability of the systems they must be protected from the trough of sea till air which occurs when the hatch is opened in adverse ship entry is significantly increased by making that down withdrawal.

The level of oxygen in the submarine is measured on the recovery pressure gauge (Fig. 1). Present regulations state that according with the indicator continuously in the yellow section, ie between 25 and 22 inches Hg (45.5 mmHg or 8.11–7.48 mBar) is not permitted, and that starting must cease immediately the indicator reaches the red section, ie below 22 inches Hg. The reasons for such large possible variations in oxygen result from changes in sea level atmospheric pressure and, particularly in the diesel starting submarine, momentary closures of the coast induction valve due to high sea states while the engines remain running.

Numerous verbal reports by SSK officers have been received about employing the long periods in the yellow section and even one report from an Australian officer who claimed to have passed through the yellow section to the red and on into the green

FIG 1
DIAGRAMMATIC REPRESENTATION OF
SHORTING PRESSURE GAUGE
INCHES OF MERCURY



usage!

It has been an important function of the Submarine Medicine Section, Institute of Naval Medicine, to explain to submariners offshore the need to consider oxygen in terms of partial pressures and not percentage volume. In fact it is quite possible that the reason why stratter attention has not been paid to the working regulations is because the air that is being drawn into the submarine is fresh air with 20.9 per cent by volume oxygen. Unfortunately though if the ambient pressure in the submarine is only 630 mmHg then the percentage equivalent of 760 mmHg is only 17.3 per cent or a true partial pressure of 108.7 mmHg. The maximum acceptable level of oxygen in all classes of submarines is 107 mmHg partial pressure below which night vision acuity deteriorates and mental performance deteriorates measurably.

Instrumentation

Atmospheric fluids had been carried out in RMS Cuckoo (Thom 1976) and in HMS Gipsy (Jolly and Hughes 1976) to investigate the effects on personnel living in

conditions of prolonged partial vacuum and to provide advice to Flag Officers Submarines on atmosphere pollutant build up and removal rates under steady and starting conditions. In 1976 an opportunity arose to install a Pys Atmospheric Analyser (1) of the type used on all nuclear submarines, into HMS Gipsy and over a prolonged period record partial pressures of oxygen, carbon dioxide and hydrogen. The degree of accuracy and consistency had hitherto been unobtainable in previous trials which used uncalibrated portable and specially adapted laboratory instruments and needed sufficient pressure to be recorded separately to convert instrument readings to partial pressures.

The Pys Atmospheric Analyser employs the technique of gas chromatography to separate oxygen, carbon dioxide and hydrogen and quantitatively measure each using a katharometer detector. Results are displayed on a pen recorder directly in partial pressures, thereby eliminating the requirement to measure ambient pressure separately. In the event ambient pressures were recorded to allow a comparison to be made between oxygen partial pressures and relative vacuum.

The analyser was mounted on a table in the cage lying into the main store passage, the position being chosen for least inconvenience. Atmospheric condensation products between compartments were not considered to be a significant factor as Thom (1974) had shown that except during certain specific activities they were not demonstrable. The absolute pressure indicator and auxiliary equipment were located on top of the analyser and oxygen carrier gas cylinders situated nearby. The system was powered by a Pys regulator which used with HMS Gipsy for the last 20 days of her deployment.

Data Collection and Analysis

The analyser was run as continuously as possible under all conditions of surface and

dread submarine states and was expected for over ten months. Data were recorded hourly for the duration of the trial in addition to collecting the post mortem data which had continuously. Reported data consisted of submarine ventilation state, sea state (Beaufort) ship's crew (dread dread morning), surface open or surface morning, submarine ambient pressure and analyzer analyzer results.

An endurance was repeated during the trial a period of 400 hours of continuous monitoring and hourly logging was selected as representative of the whole and executed. This showed that 50 per cent of the period was spent surfaced and 49 per cent dread. However, as the surface time included surface morning a fairly breakdown of the submarine state is as follows:

SURFACE (open)	28%	(137 hours)
EMERGING	20.4%	(148 hours)
DIVED	41.6%	(209 hours)

During surface (open) morning, oxygen levels were able to remain in 128 mmHg. On commencing work submergence, ambient pressure in the submarine dropped almost instantaneously to 105 mmHg or below. This sudden drop had been expected having been observed in earlier trials. Similarly oxygen partial pressure dropped proportionately to new minimum or below minimum acceptable levels. Moreover on every run half the occasions when the submarine dived following a period of work submergence, the ambient pressure remained low, thus the submarine commenced a dread period with oxygen levels close to or below the minimum permitted level of 127 mmHg. During a surface morning period at the beginning of the trial 55 hours was spent continuously, with one exception only, with oxygen below 127 mmHg partial pressure. Significantly a higher sea state was recorded during the period which could have been accompanied by a general lowering of atmospheric pressure at sea

level leading to the very low partial pressures of oxygen recorded.

On diving oxygen levels decreased at approximately 1 mmHg/hour, and following periods when work submergence immediately preceded the dive and equalization of pressure had not taken place, oxygen levels fell well below the minimum permitted level. One such period of 15 hours continuously dread resulted in an oxygen partial pressure of 126 mmHg being reached (Fig 2).

It will be noticed from Figure 2 that oxygen partial pressure rose after reaching the low point of 126 mmHg. This was not due to the burning of oxygen candles (none of which were burnt) but because normal valve operations made the submarine return high pressure air into the atmosphere thereby raising the ambient pressure. Also it will be apparent that for the whole period covered in Figure 2 morning which lasted the relatively short periods of 30.35 minutes, caused a very significant lowering of ambient pressure and that equalization throughout the period never took place completely.

Instructions read which state the time allowed submergence before it is necessary to generate oxygen by the burning of oxygen candles. Unfortunately read recently these instructions did not take sufficient pressure into account and for the period shown in Figure 2 a dread period of 15 hours was allowed before continuously oxygen generation. Following the publication of the report upon which this note is based (Jelly & McLaren, 1971a) recommendations were made to correct the tables of time allowed submergence before oxygen generation, and these took ambient pressure at the submergence into consideration.

Conclusion

Whenever an ISS, under a relative vacuum, is dived on the submarine by the action of the dread engine, some of which are supercharged. Until recently the



lowering of the ambient pressure by as much as 150 mmHg had not been taken into account when calculating how soon after diving oxygen gasation should be started. It has now been clearly demonstrated in a series of submarine trials that potentially serious consequences due to mild areas of lowered right ventricle artery and venous performance could result from the practice of diving without pressure equalization, and that ambient pressure in the submarine is an essential factor when calculating reintegrated time before starting oxygen gasation.

Acknowledgement

My thanks are due to the Medical Graphics Department of the Institute of Naval Medicine for the illustrations.

References

1. KELLY, E. J. and HUGHES, E. D. (1975) Asphyxiation syndrome in an O₂ atmosphere. *BMJ* **Report** *iii*, 45-46.
2. KELLY, E. J. and McLAUGHLIN, D. (1976) Submarine asphyxiation syndrome trial - HMS Orest. *BMJ* **Report** *iii*, 24-25.
3. TUCKER, J. A. (1976) *BMJ* **Editorial** - Asphyxiation syndrome. *Report on the Submarine Air Purification Committee* 280-284.

A Case of Idiopathic Apical Root Resorption of the Maxillary Molar Teeth

M. S. Swanson

ABSTRACT

Idiopathic apical root resorption of all maxillary molars in a young woman, and also upper incisors in one instance, is reported. Discussion.

Clinical History

During a course of routine treatment on a 20-year-old male patient, it was decided to extract a vital incisor in its greatly resorbed condition. The examination of the resorbed tooth it was noticed that the buccal root was short, and only a small apex of the palatal root remained. The radiolar surface of the tooth was smooth and characteristic of a tooth undergoing resorption. Both intra-oral radiographs and an orthopantomograph revealed that the remaining maxillary molars were similarly affected (Fig. 1). These teeth all gave a positive response to an electric pulp tester were symptomless and showed a surprising lack of mobility. The patient's general

health was good and serum alkaline phosphatase, phosphorus and alkaline phosphatase were within normal limits.

Discussion

Whereas resorption of the deciduous dentition is a physiological change, the resorption of permanent teeth must be considered to be pathological. Conditions including, perhaps, periodontitis, resorption, cyst or pressure from impacted teeth, can lead to resorption and ankyrosis or resorbed teeth run a greater risk of being resorbed in other cases, including the one being presented, the condition is idiopathic. There are only subsequent reportings of this type of condition. The teeth concerned are usually maxillary molars although other teeth may be affected (Gump, 1934; Byrle and Croder, 1942) have reported the condition in a third



Fig. 1. Intra-oral radiograph and orthopantomograph showing resorption.

secondary studies. But even involving all secondary studies have not so far as I can ascertain, been documented.

References

BECKS R. and COWDEN R. C. (1942). *Beck's*

Statistics and their relevance to pathology. New London: Saunders. *Journal of Gerontology* 26, 143.

CHERRY R. G. (1964). *Days and Nights* (London 1964) (London: London & Edinburgh: Longman, 142).

The Fruits of Exchange

Captain J. Vassonari, RMC, USN

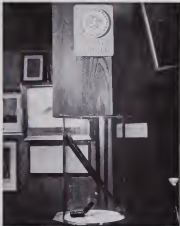
Shortly after returning to the United States following my appointment as Exchange Officer of USNM and RNMPL, I took my ten days off a visit to the US Navy Memorial Museum in the Washington Navy Yard. I was pleasantly surprised to find an exhibit which was on loan from Singapore Commodore David Dalgleish consisting of a telescope and pocket sun dial and compass (Fig) which once belonged to John Paul Jones, the Naval hero of the American Revolution.

According to Singapore Commodore Dalgleish, the items were given to his great great grandfather, William Turner Dalgleish, by John Paul (the Jones was added after he arrived in America when he left Scotland in 1775). They have been passed down through the family ever since. It is known that John Paul Jones was a native of Kirkcubrightshire and was a seaman in the coastal trade and also trading overseas in 1774 when he left Scotland for London and then America. He was the Master of the *John Paul* (Kirkcubright). The coordinates of the position on the sun dial is for a latitude of 36° North which is just north of the Solway. It is a very probable that John Paul Jones used this item and the telescope on his coastal trading.

In Singapore Commodore Dalgleish's letter

to Captain Roger Patten, USNR, The Museum Director he states that although the gift of these objects was thought to have been made when Jones left Scotland, they may have been given on a return visit. This is unlikely since the only visit Jones made to Scotland again was at the year 1776 at which time he was busy harassing the shipping on the West Coast of Scotland and particularly the Solway area. In April of that year he landed Whitehaven, burning shipping in the port and taking all the prizes of the port. The day after this raid he proceeded to St Helier, St. John where he landed on April 23rd, hoping to capture Lord Selkirk who he wanted to hold as a hostage for the return of prisoners. Lord Selkirk was not there so the landing party left with all his silver. Jones considered this an unfortunately raid and later returned the silver from France. The following day he captured *SEMPY* (Duke ship) and took her (Duke).

Singapore Commodore Dalgleish must be gratified to know that this object has been one of the most popular in the museum for more than a year and according to Captain Patten, interest is still high in it. The US Navy Memorial Museum and all its visitors during the Bicentennial Year are grateful to Singapore Commodore Dalgleish for allowing us to share these pieces of history with them.



Archie Robinson

Thanks are due to Howard L. Schneider (Chicago, IL) and Captain W. G. W. (USA) for the photograph and correspondence concerning these matters.

HONORARY DEAN GEORGE E. T. J. BURNS CB
CBE, died on May 18, 1977. An ordinary doctor and
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Editorial

*What is the hardest subject
I bet which you cannot drive
To see with just my eyes
That which is in front of your eyes*

— Gaudin

The medical task is being challenged by the destruction of excessive administrative control. A new tempo is approaching that of a Whistler. There is here a time in which the movement between bedrocks hardly allows time for useful activity within them.

The correspondence columns of this Journal draw attention to problems with which we should all be concerned. The problem of teaching while working, and the problem of availability of useful and relevant information.

The dissemination of useful references is a major problem not aided by the present homophony and the flood of disposable materials from us to ourselves. Some would say the dissemination and selection of useful information and communication is the problem of modern man. Man who became preoccupied by his ability to communicate, and so benefit by the sharing of learned experience, is in danger of sliding back into a technological dudge and other restrictive mores, not unlike the parental mind — though perhaps more doting and less fearful. We transmit pictures and words and numbers over distances, but do we understand? In the sense of that the rabbits may observe the exported material, and despite the technological change we often don't get the

message.

In medicine the importance of research, reading and communication by speech and writing has been well commented in a recent editorial¹ which of course could wait profit. We may have more knowledge than we can use or report, but without action currently we stagnate. Research is superfluous if it is inseparable from higher learning and should be both useful and enjoyable. In medicine we need to learn throughout our professional lives, for without daily practice we lose the skills of coordination of eye, of hand and brain, the skills we use both for learning and doing.

In the May we believe in communication our needs and ideas highlight our present problems and may reveal the roots of them. Usually in the May the difficulties of teaching, we also draw our mind to another old stand by: acquaintance between individuals, a knowledge of each other's departmental problems, and the use of recognized staff procedures. There is now a widening and growing awareness of the May's problems in the medical service, even perhaps an increasing awareness in the May as a whole of ours.

Our failure to explain these problems and lack of understanding may account for our present position in the present which best we perceive which have been shared in part by the May as a whole. There is here the rub. The May has largely had its evidence and should look forward to a

period of stability. Our systems is repeatedly aimed in different ways without usually being measured out into the tempo and administered. We speculate on its fate and what will be the result.

We need to be released from the continuing interference. When the medicine comes in is to be hoped it will provide the emblem. Such a beautiful and a simple function structured organisations with proper jobs and task linked in Commonsense can be effective and an achieve real economy. Proper jobs with proper results

will get and action proper people to do the real task.

It is possible with expertise and experience to prove a book even to alter its shape, and reduce its size without reducing its impact its flow and its links. The present administrative studies show no such expertise or objective. Their separation in carving from its carving a servant whose task is to serve and to serve and to see as heally man real staffs in some the patients in the Navy of which it is an integral part.

—O—

The Mission of Ascent subsequently set up a committee on old world's ascent techniques and human contact under the Junior Counsel and reported in 1958. Mission of the Committee on Old World Ascent Techniques and Human Contact. It recommended that neurological procedures be called in when there was any possibility of human descent (important for about 10 per cent of animals tested) or when descent would involve an injury and surgery. Since then Mason (1962) and Stevens (1970) have provided a comprehensive survey of the R.A.P. contribution to the study of the causes and prevention of altitude sickness which includes the investigation of morphological, physiological and physical causes, the factors of preventing safety equipment and the physiological of acclimation from climbing documents, preliminary physical and neurological examinations and blood counts.

Investigation of the injury

In 1971, Waterworth and Carr analysed post-mortem findings in 21 victims of the Birmingham rock hospital, whose deaths followed the pattern of those reported by Kennedy and Johnson (1970) in British under water circumstances. They found 18 of the 21 cases showing the classic occurrence of first long multiple subarachnoid and parenchymal hemorrhage and intracranial pressure, with the walls of the air passages which contained the pharyngeal tissue. Head dorsal fluid of pulmonary infection. During World War II Williams (1942) described the nature of order with that with a high pressure wave travelling at the speed of sound, modified by reflection from the bed or the surface of the floating surface as a shock of spray with local turbulence, was caused by a high column of water projected by escaping gases. These effects are reproduced in the human body. Whitby (1942) described the clinical presentation and Cameron et al. (1942) the heart anatomy. Kinsley (1954) has recently reviewed the physical and biological effects of multi-stage exposure, showing the difficulty of providing adequate protection against pulmonary complications (like body fluid) mainly during the submersed condition, i.e. only after the chest.

The cardiac lung condition from various factors is closed gas (which has been with us for over 100 years) and the associated pulmonary system accurately described as one world with (Stevens, 1970). In 1964, the pulmonary complications in human are often confused in terms of the respiratory tract (Pollard, 1970). Difficult to distinguish in certain cases (Stevens et al. 1967) and possibly only with careful in some cases from

an isolated pulmonary. Hampton (1971) discussing the pulmonary complications of 28 scuba divers trapped in the under-filled compartment of a ship, attributed the bronchospasm and pulmonary infection entirely to related systems. In 1968, Potts (1970) reported that in human exposure to hypoxia and pulmonary infection, the effects of flooding and trapping of the pulmonary capillary embolism, showed evidence of the flooding and trapping of the pulmonary capillary embolism, probably a later development of the flooding and trapping of capillary embolism and mechanical effects reported by Maynard et al. in 1953 following the exposure of rats with alpha-naphthyl thioester (A.N.T.E.). Pulmonary infection can result from a wide range of organisms, from environmental and indigenous factors.

Acute research has concentrated on the nature of the wound caused by high velocity impact. Scott (1970a) has recently reviewed the concept, human literature and reported his own studies relating conditions effects to tissue to body type and velocity. Results of such studies have shown that the nature of a wound wound is determined by the mass, shape and velocity of the impact together with its behaviour during flight and within the body. Velocity is of impact on and over the human body of the wound is determined by the mass on penetration. Scott (1970b) notes that in all directions from its level to form a temporary cavity many times the size of the final shock, disrupting or pushing aside vessels, destroying or stretching them, perhaps with local compression and crushing forces. The temporary cavity causes a rupture, drawing in and allowing into the wound, followed by immediate contraction and, within milliseconds, contracts down to the permanent size. The effect of a high velocity impact is therefore, a greatly contained wound with a zone of tissue destruction far greater than the size of the impact itself. In addition there are the effects of secondary masses such as shrapnel, clothing, mud and debris which can be local injuries. If gas pressure is to be avoided, detection and exposure determination with delayed wound closure are mandatory.

It is evident from the experience of British surgeons (Kennedy, 1970) that of more than 100 per cent, surgery will need to be with more rapid, particularly as regard to repair like the pressure and force. In other, therefore, to establish the cause of proposed damage to the liver. Scott (1970a) and subsequent medical techniques, one of which depends upon the detection of phosphorus in liver systems are

Nonetheless, men well suited to America and America by the Royal Marines and were thought to have potential for auxiliary transport. They are certainly fit on water and being employed, use little gasoline, direct to a meeting ambulation on shore but are very fragile difficult to maneuver through steep and loose and the ship is easily damaged. Because of their high national value of collection from the sea has proved extremely difficult.

The requirement for mobile, air portable, self contained hospitals to meet mass casualty situations has been recognized and by the American MIST system consisting of expandable medical elements with light goods and medical aids, double-walled inflatable ward elements and a power unit containing a water fuel gas turbine engine supplying electricity for air conditioning, refrigeration, and heating, can provide an ambulatory (Whelan et al., 1969).

Life support

The Vietnam campaign confirmed the principle suggested by Robert Clarke that successful surgical treatment of the severely wounded depends largely upon the ready availability of blood. By 1964 it had become evident that blood resuscitation could not be sent from the Pacific theatre alone and it was only in this way that a system of blood collection and dispatch was organized in the United States along the lines of the blood banks so successfully employed by the British Army throughout World War II (Whaley 1968).

Large volume transfusions however led to treatment with lung, which Mowbray and his colleagues (Devlin et al. 1956) called congestive pulmonary. To combat this problem, full-thickness plasma was prepared in Japan by plasma-phoresis from donors of the All group and administered (Yamamoto and Ohsaki 1970). These donors in the group have no plasma antibodies it could be given to patients of any blood group and because of the rapid replacement of plasma proteins in healthy volunteers, their plasma could provide two units weekly for up to six years.

The United States Navy solved the problem in a different way (Whelan 1970). By using Group O Plasma stored at -10°C , which, when required, was rapidly warmed and reconstituted using the Huggins cryoprecipitator, plasma collected and not only transfused into patients found to be haemorrhaging blood transfusions. Plasma blood which can be stored for many years, has a role to play in making sure blood

groups available on emergency and it is well worth the British Army was among the first to do this (Whelan 1968).

The following officer was used extensively in Vietnam. Its value in controlling haemorrhage from major vessels has led to adoption and a whole body collection and life sustaining haemorrhage chambers.

A technical problem which they face in the North Sea is the rescue, transport and treatment of a third aspect, difficulties when he must follow a slow decompression schedule before being released from his capsule in a commercial, previously discovered by the fact of use of a piece of brass being in a pressurized helmet in the lifeboat. The slow release was using on the lifeboats were found the lowest actually unaccompanied through the water. A capsule was compressed to the appropriate depth and working on his lungs for 2 hours in the compressed chamber at a temperature of 15°F (10°C) while breathing a mixture of 81 per cent helium and 19 per cent oxygen which ensured oxygen he maintained the absolute unpressurized diver. Without an ascending, he reached the surface and followed a voluntary, having then to remain with his partner for 48 hours during the decompression phase (Medical World News 1965). If the problem is to be solved it will require a chamber large enough to hold the partner and his doctor readily transportable and fitted with a back on direct to a larger chamber.

CONTRIBUTIONS TO CLINICAL CARE Resuscitation of the injured

The work of Hargrove (1964) and his US Army colleagues on shock and documented non-reversible congestions provided the rationale for modern clinical resuscitation procedures using the sublingual vein, pH and blood gas determinations with the use of ensuring adequate tissue perfusion in cellular level and early correction of acid-base imbalances. In the campaign personnel large volumes of Ringer-Locke solution were used to restore blood volume (Whelan 1968) and blood was used more sparingly but, high mortality resulted from whole blood administration (Harward and Stahl 1971). The success of the trials can be measured by a hospital mortality of only 2.4 per cent of patients wounded in action (Whelan, 1971).

The surgery of man de wounds

Summarizing the lessons of World War I in 1914, Sir George Moore has this to say: "One

never being hit into shallow water when entering a low volume with a bag of birds. Injured for only 10 to 15 seconds, he reported consciousness without memory, but about 25 hours later there pulmonary edema. The water surrounding the submersion was contaminated by oil and debris from (Jick, 1959).

Lewis (1970) has attempted to trace alveolar surface tension by using α per cent ethyl alcohol (F. A. Jorgensen and Goldfarb (1971) have shown the response of events in blue lung can be attributed to pathophysiological and biochemical factors influencing blood supply (Fig. 1), with capillary endothelial damage leading to interstitial edema, accumulation of plasma into the alveoli, loss of surfactant, alveolar septal edema. Accumulation of plasma under the influence of an oxygen and fatty cellular migration including fibrinolytic in it difficult to believe that conditions appear not do other than make the condition worse.

PIEP may result in oxygen hypoxemia (Spencer, 1974). Spencer (1974) has suggested that it may also impair the pulmonary capillary circulation. What is described of oxygen? Haynes et al. (1971) exposed rats to 100 per cent oxygen in metabolic pressure. Using light microscopy the lungs appeared normal after 4 hours, but electronmicroscopy revealed interstitial edema with capillary endothelial cells, possibly controlling the vessel lumen. At 24 hours, most capillaries were empty, the damaged endothelial cells, flattened and in apposition between, interstitial edema fluid had escaped into the alveoli. Removing lung compliance and a filling defect (Fig. 2), in spite of PIEP and 100 per cent oxygen often equal doing (Spencer, 1974) is the development of the pulmonary complications of both oxygen and deep apnea in a rat in a closed atmosphere exposed and at that point until the lungs recover.

Treatment of the burned patient

In the burn field, the low volume rate in Vietnam proved the value of liquid (Goldfarb, Goldfarb, Sherry (Jick et al., 1959). In the Burn Map, we have used hyperbaric oxygen with some success in getting heavily edematized subcutaneous tissue from involved from deep burns, with pressure levels as (Jick, 1959). We have continued to develop a method for treating burned patients (Walters and White, 1974) and we currently conducting clinical trials with the Harvard on Burned head last following reports of its value in the treatment of burn cases from the United States Army



Fig. 1 Factors contributing to the pulmonary edema. Source of data: Jorgensen and Goldfarb (1971).

Interest of Hospital Research (Walters et al., 1974). Being well ventilated and early low flow pressure effects, it has proved the most test for these cases although using staff report (spiral breathing). The Tunnel with development (Falkner and Rader, 1974) was used successfully in Vietnam to provide fresh gird breathing up to down times the area of an ordinary graft with the further advantage in burn patients that it allows monitoring of the graft with less damage through the membrane. Jick et al. (1959) and Goldfarb (1971) have reported a rate rate of 75 ml per cent in Vietnam patients. The results indicated for a systematic or biological event to seal the burned surface in order to limit fluid loss and prevent infection. Using the synthetic collages described by Wicks et al. (1973), we initially succeeded in obtaining rapid epithelialization and breaking down edema in burn in 1971, compared with controls, but synthetic collages proved of little value in clinical practice. The United States Army and Navy studied the use of culture skin, pig skin (Shapson et al., 1974) and synthetic film, as a small hydrophobic pig skin has become available and incorporated with oxygen, will effectively reduce the area of the burn. It was used with good success by the limits of the room (Jick, 1974) and in the burn room (Jick, 1974) and protein low, decrease pain and allow early movement (Lewin and Korman, 1974). Mather and Harkness, 1974. (Jorgensen, 1974) was used by the United States Army and continues following the initial report of Jick et al. (1973) but shows that it epithelial poly-capillary (PC-1) film increased to reduce in surface in

in relation to different grades of inter-bronchial and intra-bronchial or bronchiole collapse (P.L. Lumsden).

Rehabilitation after injury

Rehabilitation for Nigerian soldiers of World War I was produced by Sargent (Cambridge 1942) at Port Yocco and the development of medical French, sometimes indicated surgery in 1940, during, included operations and training. In the country, the Royal Air Force has made significant contributions to the field and all three services benefit from the imaginative programmes used in introducing injured personnel to R.A.F. Chislehurst, which has kept the mortality rate to 5 per cent despite an increasing number of severely injured patients (Nylon, Perry, 1974). In particular, the treatment and recovery of limb injuries by a multidisciplinary team has been remarkably successful. Techniques have been used to overcome inhibition of anterior lower limbs in order to re-construct patterns of movement related to the anatomy of complex life, while extensive records of progress are a rare and promising development (Kinsley, 1975).

Acknowledgements

When I was invited to give the Ransom Clarke Memorial Lecture on this subject, I was obliged to look to the authorities in the Royal Navy, the Army and the Royal Air Force for information and assistance. Their ready and generous response has enabled me to give the broad spectrum of activity described in the Service as accident and disaster.

References

- ARMON, T. M. B. (1975) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1976) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1977) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1978) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1979) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1980) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1981) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1982) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1983) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1984) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1985) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1986) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1987) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1988) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1989) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1990) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1991) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1992) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1993) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1994) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1995) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1996) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1997) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1998) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (1999) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2000) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2001) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2002) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2003) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2004) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2005) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2006) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2007) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2008) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2009) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2010) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2011) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2012) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2013) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2014) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2015) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2016) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2017) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2018) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2019) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2020) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2021) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2022) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2023) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2024) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.
- ARMON, T. M. B. (2025) Mortality in the modern medical environment: a study in time. *British Medical Journal*, **3**, 10-12.

MAN (1976) 11, 91 (Pain: Long term perspectives of 1967). *Proceedings of the Royal Society of Medicine* 69, 1-10.

WILLIAMS E. B. P. (1965) Gun-shock in Warburton. *British Journal of Surgery* 52, 28.

WOLSON J. (1944) *Diagnosis of Mental Disorders*. Edinburgh, p. 32.

WOLSON J. & OTHERS (1965) New concepts in the

management of trauma (Shannon War). *American Journal of Surgery* 110, 196.

WYLLIAMS J. D. (1976) Advances in the treatment of war wounds. *British Journal* 5, 255.

WOODHEAD J. (1971) The Shrapnel War, p. 149.

WYNN PARRY J. D. (1975) Medical services of the Commonwealth in the Great War. *Proceedings of the Royal Society of Medicine* 67, 460.



Trans-rectal Prolapse of Bowel from the Anus

E. W. Taylor

ABSTRACT

A case of prolapse of bowel from the anus after spontaneous rupture of the rectum is presented. The day before surgery, following the day after delivery, a girl whilst attempting todefecate the transabdominal pressure. The pathology of disease and management of the condition discussed.

Introduction

The prolapse of small bowel through the anus after spontaneous rupture of the rectum wall is a rare occurrence which has been reported on only 21 occasions. This paper records the first case in the British Isles and covers the literature on this condition.

Case Report

Mrs D. S. This 36 year old lady was admitted to the Royal Naval Hospital Plymouth in December 1975. She had fallen that afternoon and although sustaining no apparent injury subsequently complained of abdominal pain. She was referred to hospital on a possible case of appendicitis. She had a long standing rectal mucosal prolapse.

Examination revealed an intellectually short lady with no evidence of cardiovascular or respiratory disease. There was tenderness and guarding on palpation of the lower abdomen, bowel sounds were present.

Peranal examination revealed some 3 to 4 feet of small bowel prolapsed from the anus (fig). The bowel was well innervated but relaxed and peristalsis was seen.

In view of the excellent general condition of this elderly patient the bowel was covered in warm saline packs and laparotomy



was undertaken. The bowel was found to have prolapsed through a firm transverse tear of the anterior rectal wall in the Pouch of Douglas. There was no evidence of other visceral disease.

The bowel was gently delivered back into the peritoneal cavity and the rectum repaired in two layers with continuous chromic suture and interrupted silk. The drain was sutured throughout and after careful peritoneal toilet the abdomen was closed. Ampoules — 500mg 6 hourly intramuscularly was given for 4 days. The patient made an unremarkable recovery and was discharged back to her nursing home on the 11th post operative day.

Discussion

Pre existing rectal prolapse is found in association with nearly half of the reported cases of spontaneous rupture of the rectum. Spontaneous rupture of the rectum is rare. It was first reported in 1827 and a search of the literature has revealed this to be the 23rd

recorded case — in only 23 of which has bowel or other viscera subsequently prolapsed via the anus. This was first reported by Meadon (1931). In all but two cases the prolapse has been of bowel; the others being omentum and viscera (Shelton & Tustin 1965).

The age of patients has ranged from 6 to 78 and there is preponderance in the older age groups. There is no significant sex difference.

In nearly all patients the prolapse has been associated with an increase in intra-abdominal pressure — straining at stool carrying heavy objects, masturbation, vomiting, paroxysms or falling (Allen 1948; Essex 1970). This patient's author had said he presumed to have caused the rectal rupture. Occasionally however there has been no known effect (Shen 1970) and rupture has even occurred during sleep (Dayle 1934; Mar 1972). Treatment has varied from excision of all that has prolapsed from the anus (Alfred and Lipton 1964) to simple closure of the rupture in the rectum.

A dehiscencing colostomy has been recommended at the same time to the operating time or stress to the patient and before he discharges him to peritonitis (Essex 1970; Houston, 1966). The high mortality following such operations — 32 of the 12

cases cited by Mar died, indicates its very serious nature. It was considered a prudent risk not to perform a dehiscencing colostomy at the same or even at the patient's age and the wish to avoid a further operation.

Acknowledgement

I wish to thank Surgeon Captain J. W. Richardson DSE RN for permission to report this case.

References

- ALLEN C. P. (1948) Spontaneous rupture of the colon. *Lancet* [2].
ALLEN C. P. and SHULTON B. L. (1954) Spontaneous rupture of sigmoid at a distal constriction through the rectum. A contribution of a foreign local prolapse. *Annals of Anatomical College of Surgeons* 49, 107.
ALLEN C. P. (1956) Spontaneous anal constriction through the rectum due to sigmoid rectal rupture. *Annals Anatomical College* 55, 745-757.
DAYLE W. (1934) Laparotomy in rectal perforation. *Journal de Chirurgie* 37, 167.
HENDRICKY L. (1966) Spontaneous rupture of the colon — a 30 year survey of rectal constrictions through the anus. *Annals of New Zealand Journal of Surgery* 36, 134-137.
MAR J. G. (1972) The proctoparastomy of rectal tears. *British J. Surg.* 59, 3, rectal prolapse. *Medical Journal Australia* 4, 333-334.
MORLAND T. and TILKIN C. (1961) Spontaneous rupture caused by straining during defaecation in a male volunteer — a surgical lesion of small intestine through the anus. *Journal of Surgery* 80, 77-79.
SHULTON B. L. (1956) Rupture of the colon and tears of intestine in an infant case. *Philosophical Transactions* 213, 1.

The Use and Abuse of Parenteral Nutrition

J. G. Williams

ABSTRACT

There are often leads to malnutrition of protein. When not seen at early postoperative recovery, this leads to negative nitrogen balance. Starvation is distinct of this a process. This can be pointed by the metabolic processes that may show a state of anorexia of metabolism even at the early stage and the

Introduction

Parenteral nutrition (PN) implies intravenous feeding. Commonly in popular belief the concept is new, having been first tried over one hundred years ago (Hodder 1973). More recently it has gained world-wide acceptance and its value has become increasingly recognized. Nonetheless it is still used too little, in times inappropriately and at times with danger.

Background (Hodder 1973, Kincaid 1982)

The rationale for the use of PN does not rest simply on the failure of enteral feeding. The completely response to physical stress, whether by trauma, trauma, surgery or sepsis, is complex. Surely it can be summarized



Extra nitrogen use in the same leads to rapid loss of nitrogen in the absence of adequate oral or enteral nutrition of protein.

The duration of negative nitrogen balance depends upon the nature, severity and duration of the stress. Following

uncomplicated elective gastric surgery it usually lasts 4 to 5 days. Postoperative nitrogen retention thereafter has preoperative levels of body and liver protein are not regained for about three weeks. In the presence of sepsis these times are much extended. If sustained the loss of protein leads to wasting of muscle, deficiency of albumen leading to oedema and of globulin with impairment of resistance to infection. Wound healing is delayed and anaemia develops.

Indications (Ellis et al. 1978, Johnson 1972)

The indications for PN are simple in theory but more difficult in practice. This is because the decision to feed a patient intravenously is an issue one which implies time, effort, expense and a great deal of care on the part of the medical and nursing staff, using techniques that are not without danger to the patient.

PN should be considered as any patient in whom oral feeding (including nasogastric — the feasibility of which must always be carefully considered) is impossible or inadequate. Major catabolism may arise following extensive burns, trauma, or major surgery especially in the presence of sepsis or renal failure and is an absolute indication for PN. Moderately catabolic states (severe postoperative as well as postoperative) and intestinal failure due to necrosis, inflammation or failure are relative indications in which PN should be considered early and a positive decision made as soon as possible. Prioritization is

the hope that adequate cell feeding will become possible almost instantly leads to inadequate nutrition with consequent spoil of tissue as depicted PM should be started sooner rather than later.

Methods

Experimental work has defined the following principles which govern the composition of preparations used in parental nutrition.

Amino-acids are required for the synthesis of protein but there must be an *in vivo* source, here, the larval intestine, from, and the proportions of each amino acid and the state of ionization is not considered as critical (Frieden, 1948; Hadfield, 1953). Energy is required for the synthesis of protein from these amino acids and this can be supplied as fat and/or carbohydrate (though recent reports have suggested that amino acids alone may be sufficient in parenteral support, but not protein-sparing nitrogen balance (Singer, Grant, Goodfriend and Kohnen, 1955; Moore and Freeman, 1955)).

To be utilized properly fat requires carbohydrate which stimulates the Krebs cycle and smooth intake. The use of carbohydrate alone on the other hand, will eventually lead to essential fatty acid deficiency (Pena-Kilgus, Shumayama and Thompson, 1954). It is preferable therefore to use both energy substrates together. Carbohydrate is best given as dextrose but like other sugars commonly used, this is highly osmotic to the extent that the concentrations required to give adequate energy without too much water. Fructose and sorbitol have an advantage over dextrose and especially run a greater risk of haemolysis and osmotic diuresis, leading to hypotension (Lamer, 1953). If the patient is severely catabolic fluids may be required to maintain euryglycaemia; whatever of these sugars is used Ethanol may also be used but correct the risk of intoxication and liver damage.

Intestines fat has to be given in an emulsion and Whistler (1953) has suggested that the particles of the emulsion should have the same properties as natural lipoproteins from the intestine itself. He has shown that even beans of emulsified with egg lecithin and made osmotic with glycerol (dextrolol) has many similarities to chylomicrons and has minimal toxicity, both in dogs and man. Emulsions of cotton seed oil are cleared from the plasma faster than egg lecin but have been shown to be toxic in dogs. This toxicity is probably due to the emulsifying agents rather than the oil itself and newer preparations may be less toxic.

The following table summarizes the commonly used preparations of amino acids, carbohydrates and fat.

Practical Details

It is advisable to be familiar with, and use exclusively, a few preparations rather than use a wide variety of commercial products. The proportions of amino-acids, fat and carbohydrate to be given require careful planning. The requirements of each patient will vary but the following are useful guide lines:

1. Approximate energy yield of substrates (kcal/g)

Carb.	+
Lipid	+
Amino-acids	+

(Conversion to SI units: 1 000 kcal = 4.1 MJ)

2. Approximate requirements per kilo gram body weight per day

	g/kg	Calories	Moles
Glucose (mg)	10	40	0.2
Fat (g)	1.5	22	0.1
Carbohydrate (g)	2.5	10	0.1
Amino acids	20	80	0.5

One atom of nitrogen is equivalent to 4.25 grammes of protein, or about 25 grammes of muscle tissue.

3. This represents approximately 200 kcal

Table

	Source	Substrate	CPM/g or	CPM/ protein	pH	at	at	at	Notes
High energy ATP	ATP + S	Adenine + S	11,000	100	7.4	5.0	30	30	Cell exposed to hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	4,111	100	11.15	5.0	100	4.0	Cells in presence of hypoxanthine and 8T. This is used as a control.
	Adenine + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	Adenine + S	Adenine + S	11,000	100	10.00	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
High energy GTP	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
High energy GTP	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.
	ATP + S	ATP + S	11,000	100	7.4	5.0	30	30	Cells in presence of hypoxanthine and 8T. This is used as a control.

energy per gram nitrogen, with half the energy in the acid and half in carboxylate.

Thus a moderately elevated 150g/mole (by following major pathway) will require in the region of 70 nitrogen (50g protein) 1,000 kcal energy (30 x 140 kcal from 50g fat and 150g carboxylates) and 2.5 to 3 liters of fluid. The exact amounts are not critical — it is more important to remember to fol-

low the electrolyte content of the region, and to avoid overloading with sodium or underloading with potassium. Standard requirements of these electrolytes will be about 100 mmol/day of sodium and 50 mmol/day of potassium. The high concentration of sodium and lack of potassium in some amino acid preparations should be noted.

Suitable regimens for the above example would be either:

Volume given (l) per
litre urine (l) or (l) per
litre urine (l) or (l) per

or

Volume given (l) per
litre urine (l) or (l) per
litre urine (l) or (l) per

Such regimens total 2.6 litres of fluid allowing room for the addition of essential vitamins and trace elements. These can be provided by giving daily parenterals and Addon solution (Miles-Davies Ltd — 1 pint contains the daily requirements of most trace minerals and copper) or 100 ml 5% dextrose. No supplements should ever be added to fat emulsions or amino acid solutions. Folic acid (5 mg) and vitamin K (10 mg) should be given weekly by intramuscular injection. Calcium and magnesium are included in some parenterals (see table) and supplements should be given if these are not used. Hypophosphataemia will be avoided if fructose and/or other phosphate containing products are used. A bottle of plasma per week is an alternative but less reliable source of trace elements.

As well as ensuring intake it is extremely important to monitor losses of electrolytes and nitrogen in the urine and intestinal secretions (if aspirated). These must be measured daily because loss in the urine can be calculated simply by multiplying the daily output of urea by 0.58 — urea makes up 80% of urinary nitrogen loss and 1 g urea contains 0.41 g nitrogen) and checked on an intake/output balance sheet. It is also advisable to calculate the fluid nitrogen electrolyte and caloric intake on a daily basis, as well as the full blood count and plasma electrolytes. Body weight, liver function tests, serum and urinary calcium and phosphorus, and glucose constantly should be measured weekly. The urine should always be tested for sugar and blood glucose estimated if necessary.

The infusion can be given into a

peripheral or a central vein. If a peripheral vein is used the drip rate will tend to be changed frequently. It is wise to start in the subclavian femoral and move directly to phlebocath leads to achieve proximally only and more veins will be usable. Phlebocath access and solutions should be given at the same time as fat emulsions, through a Y connector. If possible carbohydrate solutions should be given before or with amino acids to ensure maximum utilization. Asceptic technique in setting up and maintaining the drip is mandatory. If a central line is used suction is even more essential as the risk of septicemia is high. This risk is enhanced if the line is used for the administration of drugs or the aspiration of blood, which should be avoided if at all possible.

Summary

Parenteral nutrition is no longer a luxury but an essential part of the management of seriously ill patients. It should be contemplated and used early, to prevent further nutritional deterioration. When in use great care and attention to detail should be exercised and the patient closely monitored. Intravenous feeding is specific therapy but merely a nutritional alternative to decrease/avoid

References

1. CLINE W, STAMMERHOE E & L. FELDMAN J. P. (1974) A parenteral approach to parenteral nutrition. *British Medical Journal* 1, 198-201.
2. FALKOWITZ J. (1975) Parenteral feeding in surgical patients. *Annals of the Royal College of Surgeons of Japan* 46, 104-110.
3. JODGES R. M. (1975) Disorders of milk in clinical biochemistry. In (ed. J. D. GIBSON & J. C. GIBSON) *Parenteral Nutrition*. The New England Journal of Medicine 293, 153-170.
4. KAPLAN J. B. & (1975) The role of parenteral nutrition in surgical care. *Annals of the Royal College of Surgeons of Japan* 46, 110-118.
5. LANCET (1975) Intravenous feeding. 2, 1179-1180.

Royal Naval Dockyards Asbestososis Research Project — Survey of Registered Asbestos Workers

P. G. Haines and R. F. S. Lusby

ABSTRACT

A Register of Asbestos Workers was set up in each Royal Naval Dockyard (RND) to provide details of health of those who worked with asbestos and thereby facilitate exposure to asbestos surveys.

The members of this group of workers obtained their radiological chest and lung function abnormalities measured with exposure to asbestos only, compared to the other men who had these measured before the introduction of safer practice measures.

The results obtained will form a valuable base for the design of measures to reduce asbestos exposure.

Introduction

The major programme to examine the effects of asbestos exposure on the health of Naval Dockyard workers is described by Haines, Bowker and Cole (1976), and the results of the detailed examination of a random sample of these workers, classified by age and occupation, are described by Bowker and Haines (in preparation).

When it was discovered in 1963 that cases of asbestosis were occurring among the asbestos workers at Devonport Dockyard the Ministry of Defence (MoD) brought about great improvements in working conditions and protective clothing and substituted safer materials for asbestos wherever possible (Haines 1968, 1970). In addition, facilities were asbestos still had to be used and asbestos still had to be removed from Naval Ships each Dockyard was required to compile a register of all the people who had worked directly with asbestos whether full or part time to ensure that their health was suitably supervised at regular intervals whilst they remained in Ministry of Defence (MoD) employment; even if they subsequently stopped working with asbestos.

These employees were called Registered Asbestos Workers (RAWs). It was considered particularly important to try to obtain a high response rate from these workers as a basis for assessment in the future, and this register contained with the detailed radiological chest and lung functional results obtained from the examination of these people.

Methods

Selection of the Population

The number and occupations of Registered Asbestos Workers in each Dockyard varied according to each Dockyard's need for employees in various occupations to work with asbestos. Shortly after the examination of the population in each Dockyard that is: 1 March 1971 for Devonport, 4 September 1972 for Chatham, 5 January 1973 for Portsmouth and 1 August 1973 for Royal, the Personnel Department in each Dockyard was asked to provide a list of all the Registered Asbestos Workers. Those who were aged 16-69 years on the pensionable date also formed Group 1 of the age and occupation stratified sample (Bowker and Haines — in preparation). There were two females and two male Registered Asbestos Workers who worked in places outside the main Dockyard areas. Excluding these there were 900 male RAWs of all ages currently employed within the Dockyards (Main or Yard Registered Asbestos Workers) who form the population for this study.

Abnormal Data

As the beginning of the Maritime Survey in which Dockyard staff Registered Seafarers' Workers was asked to attend for a full size chest radiograph, spirometry and clinical examination and lung function assessment. As part of the printed response to the study of the total Dockyard population a number of these workers had also completed a self administered questionnaire on respiratory symptoms and occupational history, but they were deliberately asked not to attend for a 100 mm chest radiograph because they were all reported to have a large chest radiograph as part of their regular annual medical examination which on this occasion was verified and by the Survey team. In the next 96 men did have a 100 mm chest radiograph taken of whom 36 had only chest wall film.

Full Size Chest Radiographs

Full size (40 cm x 40 cm) chest radiographs were taken by the Medical Research Council's Mobile Radiographic Unit. Two views, posterior-anterior and right anterior oblique, were taken. Full details of the procedure are given elsewhere — Renshaw and Murray (in preparation) and Murray, Kervagh, Gibson and McKenna (in preparation).

The subjects were contacted shortly after the full size chest radiographs were taken. It was based on the Medical Research Council's Respiratory Questionnaire 1966 modified to include all the questions reported by the Employment Medical Advisory Service National Survey of Asbestos Workers (EMAS, 1975) because all of these workers were to be included in the Survey. Questions were also asked on chest pain and to establish a full occupational history.

The Clinical Examination was usually confined to the respiratory and cardiovascular systems. In all subjects the presence or absence of cyanosis, rales

rhonchi, pleural rub, finger clubbing and other signs were noted. Blood pressure was recorded with the subject seated. Height and weight was recorded in indoor clothing without shoes and jacket.

Lung Function was assessed by measurements of Forced Expiratory Volume in one second (FEV₁), Forced Vital Capacity (FVC) and Transfer Factor (TF) using the single breath carbon monoxide method. Values for Residual Volume (RV) and Total Lung Capacity (TLC) were obtained during the TF measurements. Full details of the methods used are given by Murray and Murray (in preparation).

FEV₁, FVC, RV and TLC are reported in Litres at body temperature and pressure saturated with water vapour (BTPS). TF is reported in millilitres per minute per litre Pulsed (normal mean 1 kPa⁻¹) at standard temperature and pressure dry (STPD).

Results

Response Rates

The number of men included in the study together with the numbers of responders by age and dockyard are given in Table 1. Altogether 92.4 per cent had a large chest radiograph taken, 91.7 per cent had a completed questionnaire and 92.8 per cent underwent lung function assessment.

Classification of Chest Radiographs

The percentage rates of radiographic abnormalities are given in Tables 2-6 and the reading of the large films has been read except for those 36 men who only had a 100 mm film taken. The percentage rates are based on the independent reading of the radiographs by two of a panel of four readers* using the simplified classification described by Harris *et al.* (1971). Each a. r. reading was allocated to one of the following groups.

*Independent of the study: S. J. Smith (a. r.), D. H. Mayall, Northern Commanders P. C. Murray and R. P. A. Lamb.

1. Normal films.
2. Pleural thickening.
3. Pleural calcification.
4. Pulmonary fibrosis (approximately equivalent to ILO/ICC 1971 category of small irregular opacities of 1-3 of score).
5. Pulmonary calcification including primary complex.
6. All other abnormalities.

To avoid bias by having to choose between discrepant readings each reading was counted as a 1 in the calculation of prevalence rates.

Radiographic Abnormalities

Table 1 gives the overall prevalence for each of the categories of radiographic abnormalities by cigarette age and smoking habit, but without taking into account any index of exposure. For pleural thickening and pulmonary fibrosis, non smokers have lower prevalences than smokers, whereas for pleural calcification the prevalence rate is highest in ex smokers.

These results for pleural thickening and pulmonary fibrosis agree completely with those from the study of the sample population (Russett and Harries — in preparation) and again confirm results such as the study of the total population where exposure rates are not so high (Harries *et al.* 1976). The patterns for pleural calcification and pulmonary calcification differ in that for all RANs the ex smokers have the highest prevalence. As described by Harries *et al.* (1976) the smokers and ex smokers develop pleural calcification rather than dense smokers.

ILO's and other relationships between prevalence of radiographic abnormalities and age. Pleural thickening is more prevalent in Portsmouth and pleural calcification in Portsmouth and Chatham. Pulmonary fibrosis was not seen at Bough and the rates at Devonport are a little lower than at Chatham and Portsmouth.

Pleural Thickening

Tables 2 & 6 give the prevalence of pleural thickening by age and smoking habit for the four industrial employment and exposure exposure. There is not very much variation in the rates for any of these indices for the younger men in that evidence of pleural response relations is largely restricted for those aged 40-50. The relations with the employment indices are less clear cut than with the exposure indices, and duration of exposure to asbestos is again the better correlate.

Pleural Calcification

Pleural calcification occurs only very rarely in these RANs under the age of 50 (Table 7). The only evidence of a dose-response relation is the increased prevalence in those over 60 years who have been exposed to asbestos for more than 20 years.

Pulmonary Fibrosis

Table 7 also shows the patterns for pulmonary fibrosis, and it is seen that the smokers develop pulmonary fibrosis more frequently than non smokers. There is a definite relation to age as reported by Harries *et al.* (1976) but little evidence of dose related response in RANs.

Pulmonary Calcification

Table 8 shows that there is some relation to age but no pattern by duration of exposure.

Normal Radiographs

At all ages, except the very young, ex smokers have lower normal radiographs than either current or non smokers (Table 6). The chart shows the dose-response of dose response relation with duration of exposure to asbestos.

Respiratory Symptoms

Chronic or Fair Chest Illness

Table 9 shows the prevalence of past history of chest illness by smoking habit.

Table 1
Percent of total catch weight of *Micropterus salmoides* by age and sex.

Age (years)	Number of sex	Sex with larger total weight	Mean weight (kg) of sex with larger total weight	Sex with larger total weight	Mean weight (kg) of sex with larger total weight	Sex with larger total weight	Mean weight (kg) of sex with larger total weight
0–10	104	Male	0	Male	0	Male	0
10–20	107	Male	0	Male	0	Male	0
20–30	105	Male	0	Male	0	Male	0
30–40	107	Male	0	Male	0	Male	0
40–50	107	Male	0	Male	0	Male	0
50+	107	Male	0	Male	0	Male	0
All ages	550	Male	0	Male	0	Male	0
		Female	0	Female	0	Female	0
0–10	104	Female	0	Female	0	Female	0
10–20	107	Female	0	Female	0	Female	0
20–30	105	Female	0	Female	0	Female	0
30–40	107	Female	0	Female	0	Female	0
40–50	107	Female	0	Female	0	Female	0
50+	107	Female	0	Female	0	Female	0
All ages	550	Female	0	Female	0	Female	0

The authors do not have data for the percentage of catch weight for all ages.

Table 2
Percent of total catch weight of *Micropterus salmoides* by age and sex.

	Sexing Policy	Percent				Weight (kg)					
		0–10	10–20	20–30	30–40	40–50	50+	Sex	Weight	Sex	Weight
Female	0–10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10–20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20–30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Male	0–10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10–20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20–30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All ages	0–10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10–20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20–30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Female	0–10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10–20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20–30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Male	0–10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10–20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20–30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All ages	0–10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10–20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20–30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

... the table shows the percentage of total catch weight for all ages.

Table 1. PREVALENCE OF RHEUMATOID ARTHRITIS, OSTEOARTHRITIS, AND OSTEOARTHRITIS/OSTEOARTHRITIS

Age Group (Years)	Working Position	Prevalence of Osteoarthritis (Osteo)									
		Osteoarthritis (Osteo)					Osteoarthritis (Osteo)				
		1970	1971-72	1973-74	1975	1976-77	1978	1979-80	1981	1982-83	1984
18-24	conductor	0.0	0.0	0	—	0.0	0	0	0	—	0
	conductor	0.0	0.0	0	—	0.0	0	0	—	—	0
	conductor	0.0	0.0	—	—	0.0	0	0	—	—	0
25-34	conductor	0.0	0.0	0.0	—	0.0	0	0	0	—	0
	conductor	0.0	0.0	0.0	—	0.0	0	0	0	—	0
	conductor	0.0	0.0	0.0	—	0.0	0	0	0	—	0
35-44	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
45-54	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
55-64	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
65-74	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
75-84	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
85-94	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0

Table 2. PREVALENCE OF RHEUMATOID ARTHRITIS, OSTEOARTHRITIS, AND OSTEOARTHRITIS/OSTEOARTHRITIS

Age Group (Years)	Working Position	Prevalence of Osteoarthritis (Osteo)									
		Osteoarthritis (Osteo)					Osteoarthritis (Osteo)				
		1970	1971-72	1973-74	1975	1976-77	1978	1979-80	1981	1982-83	1984
18-24	conductor	0.0	0.0	—	—	0.0	0	0	—	—	0
	conductor	0.0	0.0	—	—	0.0	0	0	—	—	0
	conductor	0.0	0.0	—	—	0.0	0	0	—	—	0
25-34	conductor	0.0	0.0	0.0	—	0.0	0	0	0	—	0
	conductor	0.0	0.0	0.0	—	0.0	0	0	0	—	0
	conductor	0.0	0.0	0.0	—	0.0	0	0	0	—	0
35-44	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
45-54	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
55-64	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
65-74	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
75-84	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
85-94	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
	conductor	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0

TABLE 1. PREVALENCE OF CLONING, CHLAMYDIA, GONORRHOEA, SYPHILIS, AND OTHER SEXUALLY TRANSMITTED INFECTIONS IN 1976/77

Age Group (Years)	Sexual Status	NUMBER OF POSITIVES IN 1976/77 (1000)									
		Chlamydia Serum (SI)					Serum of SSI				
		SI	SI/100	SI/1000	SI/10000	SI/100000	SI	SI/100	SI/1000	SI/10000	SI/100000
15-24	non-clonable	0.0	0.0	—	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	—	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	—	—	—	0.0	0.0	—	—	—
25-34	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
35-44	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
45-54	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
55-64	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
65+	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
All Ages	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—

TABLE 2. PREVALENCE OF CLONING, CHLAMYDIA, GONORRHOEA, SYPHILIS, AND OTHER SEXUALLY TRANSMITTED INFECTIONS IN 1977/78

Age Group (Years)	Sexual Status	NUMBER OF POSITIVES IN 1977/78 (1000)									
		Chlamydia Serum (SI)					Serum of SSI				
		SI	SI/100	SI/1000	SI/10000	SI/100000	SI	SI/100	SI/1000	SI/10000	SI/100000
15-24	non-clonable	0.0	0.0	—	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	—	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	—	—	—	0.0	0.0	—	—	—
25-34	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
35-44	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
45-54	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
55-64	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
65+	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
All Ages	non-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	sex-clonable	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—
	unknown	0.0	0.0	0.0	—	—	0.0	0.0	—	—	—

TABLE 1. *Continued* (cont.) In parentheses, the number of the individual persons who were in each group. Percentages are not necessarily equal to 100%.

Age Group (Years)	Sailing Method	Number of Sailors in Group (Total)									
		Males: Non-Indigenous					Males: Indigenous				
		<10	10-19	20-29	30-39	40-49	<10	10-19	20-29	30-39	40-49
<10	non-indigenous	0.0	0.0	—	—	0.0	0.0	0.0	—	—	0.0
	non-indigenous	0.0	0.0	—	—	0.0	0.0	0.0	—	—	0.0
	indigenous	0.0	0.0	0	—	0.0	0.0	0.0	—	—	0.0
10-19	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	indigenous	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	—	0.0
20-29	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
30-39	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
40-49	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
50+	non-indigenous	0.0	—	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0
	non-indigenous	0.0	—	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0
	indigenous	0.0	—	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0
All Ages	non-indigenous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	non-indigenous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	indigenous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(0.0 indicates no male sailing was done.)

TABLE 2. *Continued* (cont.) In parentheses, the number of the individual persons who were in each group. Percentages are not necessarily equal to 100%.

Age Group (Years)	Sailing Method	Number of Sailors in Group (Total)									
		Males: Non-Indigenous					Males: Indigenous				
		<10	10-19	20-29	30-39	40-49	<10	10-19	20-29	30-39	40-49
<10	non-indigenous	0.0	0.0	—	—	0.0	0.0	0.0	—	—	0.0
	non-indigenous	0.0	0.0	—	—	0.0	0.0	0.0	—	—	0.0
	indigenous	0.0	0.0	0	—	0.0	0.0	0.0	—	—	0.0
10-19	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
20-29	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
30-39	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
40-49	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	non-indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
	indigenous	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	—	0.0
50+	non-indigenous	0.0	—	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0
	non-indigenous	0.0	—	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0
	indigenous	0.0	—	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0
All Ages	non-indigenous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	non-indigenous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	indigenous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(0.0 indicates no male sailing was done.)

TABLE 2. ESTIMATES OF THE FIRST-ORDER CORRELATION COEFFICIENTS, ρ_{12} , ρ_{13} , AND ρ_{23}

	Sampling Method	Estimates				True Values (Normal)					
		unbiased	biased	unbiased	biased	ρ_{12}	ρ_{13}	ρ_{23}	ρ_{12}	ρ_{13}	ρ_{23}
Sample of Population of 1000	one estimator	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	two estimators	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	estimates	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
Sample of Five subgroups	one estimator	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	two estimators	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	estimates	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
Subpopulation	one estimator	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	two estimators	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	estimates	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
Five pairs (Group B) of 100	one estimator	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	two estimators	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	estimates	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
Sample of Subpopulation	one estimator	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	two estimators	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20
	estimates	0.45	0.45	0.45	0.45	0.50	0.40	0.30	0.40	0.30	0.20

TABLE 3. ESTIMATES OF THE SECOND-ORDER CORRELATION COEFFICIENTS, ρ_{123} , ρ_{124} , ρ_{134} , AND ρ_{234}

	Sampling Method	Estimates				True Values (Normal)					
		unbiased	biased	unbiased	biased	ρ_{123}	ρ_{124}	ρ_{134}	ρ_{234}	ρ_{123}	ρ_{124}
Sample	one estimator	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	two estimators	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	estimates	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
Stratified	one estimator	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	two estimators	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	estimates	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
Subpopulation (of 100) of Group B of 1000	one estimator	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	two estimators	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	estimates	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
Five pairs (Group B) of 100	one estimator	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	two estimators	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	estimates	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
Sample of Subpopulation	one estimator	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	two estimators	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30
	estimates	0.45	0.45	0.45	0.45	0.45	0.40	0.30	0.20	0.40	0.30

* Biasedness due to an estimator based on one sample design.

One sample, two estimators, by stratification.

TABLE 1. *EMPLOYED FULL-TIME, PART-TIME, AND SEASONAL WORKERS: MANNER AND EARNINGS BY SEX AND TYPE OF SERVICE TO PROVIDER*

Age Group (Years)	Working Status	Median of Reported \$ ^a per hour (Logged)										
		Males						Females				
		1-19	20-29	30-39	40-49	50-59	60-69	1-19	20-29	30-39	40-49	50-69
15-19	non-unionized	3.4	4.4	—	—	—	—	2.0	2.5	4.0	—	—
	non-unionized seasonal	4.0	4.0	—	—	—	—	4.5	4.0	4.0	—	—
	unionized	10.0	10.0	—	—	—	—	10.0	10.0	10.0	—	—
20-29	non-unionized	4.4	4.4	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
30-39	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
40-49	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
50-59	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
60-69	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
70-79	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—

NOTE: DASHES INDICATE MISSING DATA.

TABLE 2. *EMPLOYED FULL-TIME, PART-TIME, SEASONAL, AND TEMPORARY WORKERS: MANNER AND EARNINGS BY SEX AND TYPE OF SERVICE TO PROVIDER*

Age Group (Years)	Working Status	Median of Reported \$ ^a per hour (Logged)										
		Nonseasonal						Seasonal or Temp				
		1-19	20-29	30-39	40-49	50-59	60-69	1-19	20-29	30-39	40-49	50-69
15-19	non-unionized	3.4	4.4	—	—	—	—	2.0	2.5	4.0	—	—
	non-unionized seasonal	4.0	4.0	—	—	—	—	4.5	4.0	4.0	—	—
	unionized	10.0	10.0	—	—	—	—	10.0	10.0	10.0	—	—
20-29	non-unionized	4.4	4.4	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
30-39	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
40-49	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
50-59	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
60-69	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—
70-79	non-unionized	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	non-unionized seasonal	4.0	4.0	10.0	—	—	—	4.0	4.0	4.0	—	—
	unionized	10.0	10.0	10.0	—	—	—	10.0	10.0	10.0	—	—

NOTE: DASHES INDICATE MISSING DATA.

TABLE 2. Percent of Registered Dietitians by Age Group and Gender Reporting Specific or Multiple Problems

Age Group (Years)	Gender	Percent of Reporting Specific Problem									
		Joint Pain					All Other				
		Any	Neck	Shoulder	Hand	Other	Any	Neck	Shoulder	Hand	Other
15-29	non-registered	50	0	—	—	50	25	0	—	—	25
	registered	40	0	—	—	40	25	0	—	—	25
	combined	45	0	—	—	45	25	0	—	—	25
30-49	non-registered	75	25	0	—	75	50	25	0	—	25
	registered	75	25	0	—	75	50	25	0	—	25
	combined	75	25	0	—	75	50	25	0	—	25
50-69	non-registered	75	0	0	—	75	50	0	0	0	50
	registered	75	0	0	—	75	50	0	0	0	50
	combined	75	0	0	—	75	50	0	0	0	50
70-89	non-registered	75	0	0	—	75	50	0	0	0	50
	registered	75	0	0	—	75	50	0	0	0	50
	combined	75	0	0	—	75	50	0	0	0	50
90+	non-registered	75	—	0	—	75	50	—	—	—	50
	registered	75	0	0	—	75	50	0	0	—	50
	combined	75	0	0	—	75	50	0	0	—	50
All Ages	non-registered	60	0	0	—	60	50	0	0	0	50
	registered	60	0	0	—	60	50	0	0	0	50
	combined	60	0	0	—	60	50	0	0	0	50

TABLE 3. Percent of Registered Dietitians by Age Group and Gender Reporting Specific or Multiple Problems by Specific Problem

Age Group (Years)	Gender	Percent of Reporting Specific Problem (Percent)				
		Any	Neck	Shoulder	Hand	All Other
		Joint Pain	Joint Pain	Joint Pain	Joint Pain	Joint Pain
15-29	non-registered	50	0	0	—	50
	registered	40	0	—	—	40
	combined	45	0	—	—	45
30-49	non-registered	75	25	0	—	75
	registered	75	25	0	—	75
	combined	75	25	0	—	75
50-69	non-registered	75	0	0	—	75
	registered	75	0	0	—	75
	combined	75	0	0	—	75
70-89	non-registered	75	0	0	—	75
	registered	75	0	0	—	75
	combined	75	0	0	—	75
90+	non-registered	75	—	0	—	75
	registered	75	0	0	—	75
	combined	75	0	0	—	75
All Ages	non-registered	60	0	0	—	60
	registered	60	0	0	—	60
	combined	60	0	0	—	60

Table 11. Relative values of mean total counts (total) and percentages of counts (per cent) for the 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

Age Group (years)	Location (m/s)	Percentage of counts for absolute counts				
		10	20	30	40	50
4-10	no smokers	4.10	4.00	0	0	4.10
	no smokers	4.40	4.30	0	0	4.40
	no smokers	4.10	4.10	0	0	4.10
10-20	no smokers	5.10	4.80	4.00	0	4.00
	no smokers	4.40	4.40	4.40	0	4.40
	no smokers	4.10	4.10	4.10	0	4.10
20-30	no smokers	4.10	4.10	5.00	0	4.10
	no smokers	4.40	4.40	5.00	0	4.40
	no smokers	4.10	5.00	5.00	0	5.00
30-40	no smokers	5.10	5.10	5.10	0	5.10
	no smokers	4.40	4.40	5.10	0	4.40
	no smokers	4.10	5.10	5.10	0	5.10
40-50	no smokers	5.10	5.10	5.10	0	5.10
	no smokers	4.40	5.10	5.10	0	5.10
	no smokers	4.10	5.10	5.10	0	5.10
50-60	no smokers	5.10	0	5.10	5.10	5.10
	no smokers	4.40	0	5.10	5.10	5.10
	no smokers	4.10	0	5.10	5.10	5.10
60-70	no smokers	5.10	0	5.10	5.10	5.10
	no smokers	4.40	0	5.10	5.10	5.10
	no smokers	4.10	0	5.10	5.10	5.10
70-80	no smokers	5.10	0	5.10	5.10	5.10
	no smokers	4.40	0	5.10	5.10	5.10
	no smokers	4.10	0	5.10	5.10	5.10
80-90	no smokers	5.10	0	5.10	5.10	5.10
	no smokers	4.40	0	5.10	5.10	5.10
	no smokers	4.10	0	5.10	5.10	5.10

background and age. As the smokers are older they show the biggest prevalence overall, and detailed examination of the rates by age shows that this is largely an age effect. Apart from a history of injury or operation to the chest the rates for other past chest disease are lowest in Bough with the other three yards having similar rates to each other.

Current Respiratory Symptoms

The confounding effect of smoking on current respiratory symptoms is seen in Table 12 and this is true in all ages. The smoking effect is much greater than that of age for both cough and phlegm. The difference between the yards are less marked, but Bough tends to show the lowest prevalence.

Cough and Phlegm and Smoking

Tables 13 and 14 confirm the

symptoms even when duration of exposure is adjusted to take this account, and there is little evidence in this population of dose response relationships, unlike those described by Horris *et al.* (1970) and Rosner and Warren (in preparation).

Respiratory MRC Grade 2 or more (Table 12)

There is little evidence of any relation with duration of exposure and the pattern of lower rates for the least exposed men is not as clearly seen as for the sample population (Rosner and Warren — in preparation).

Age as Chest Effect

The prevalence of chest disease occurring within the last three years appears to be least in non smokers, but there is little evidence of any exposure effect (Table 14).

TABLE 10. PERCENT AGES OF TOTAL AND CURRENT SMOKERS BY AGE GROUP, 1979

Age Group (Years)	Smoking History	PERCENT OF SMOKERS BY AGE GROUP				
		20s	30-39	40-49	50+	All Smokers
15-19	non-smokers	3.33	0.00	—	—	3.33
	ex-smokers	0.00	0.00	—	—	0.00
	smokers	3.33	0.00	—	—	3.33
20-29	non-smokers	0.00	0.00	0.00	—	0.00
	ex-smokers	0.00	0.00	0.00	—	0.00
	smokers	0.00	0.00	0.00	—	0.00
30-39	non-smokers	0.00	0.00	0.00	—	0.00
	ex-smokers	0.00	0.00	0.00	0.00	0.00
	smokers	0.00	0.00	0.00	0.00	0.00
40-49	non-smokers	0.00	0.00	0.00	—	0.00
	ex-smokers	0.00	0.00	0.00	0.00	0.00
	smokers	0.00	0.00	0.00	0.00	0.00
50-59	non-smokers	0.00	0.00	0.00	0.00	0.00
	ex-smokers	0.00	0.00	0.00	0.00	0.00
	smokers	0.00	0.00	0.00	0.00	0.00
60+	non-smokers	0.00	—	0.00	0.00	0.00
	ex-smokers	0.00	0.00	0.00	0.00	0.00
	smokers	0.00	0.00	0.00	0.00	0.00
All Ages	non-smokers	0.00	0.00	0.00	0.00	0.00
	ex-smokers	0.00	0.00	0.00	0.00	0.00
	smokers	0.00	0.00	0.00	0.00	0.00

Physical Signs

Rales

Rales which persisted after coughing were present in 48 men (4.5%) and a further 40 men had rales which did clear after coughing. Table 14 shows that persistent rales occurred most frequently in ex-smokers even after making allowance for age differences. As for the sample population, there is some evidence of a dose response relationship in age groups 40-49 years and 50-59 years, but the numbers involved are small.

Rhonchi

Rhonchi occurred in 34 men and most frequently in smokers (Table 14).

Finger Clubbing

Finger clubbing occurred in 31 men mainly in current smokers.

Heart and Lungs

Heart rate occurred in only eight men who non-smokers; there are smokers and four current smokers.

Cyanosis

Cyanosis was recorded for only nine men seven of whom were smokers.

Asbestos Cysts

No asbestos cysts were recorded.

Blood Pressure

The prevalence of systolic blood pressure over 150 mm Hg is seen to increase markedly in those aged 50 or more (Table 14). Diastolic blood pressure also shows increased prevalence in older (RAW) mainly ex-smokers.

Lung Function

Average values of lung function values

TABLE 11. EFFECTS OF AGE, SEX, HEIGHT, CIGARETTE CONSUMPTION ON FEV₁ (L) AND FVC (L) IN 1000

Age Group (Years)	Smoking Category	Predicted FEV ₁ (L) (Standard Deviation)				
		Men	Women	Men	Women	All Cases
15-19	non-smokers	1.88	1.40	—	—	1.64
	ex-smokers	1.56	1.49	—	—	1.52
	smokers	1.71	1.40	—	—	1.55
20-29	non-smokers	1.91	1.50	1.50	—	1.70
	ex-smokers	1.60	1.47	1.74	—	1.60
	smokers	1.68	1.50	1.68	1.50	1.59
30-39	non-smokers	1.94	1.55	1.58	—	1.73
	ex-smokers	1.61	1.48	1.69	1.50	1.59
	smokers	1.69	1.49	1.65	1.50	1.52
40-49	non-smokers	1.81	1.50	1.45	1.40	1.64
	ex-smokers	1.54	1.40	1.54	1.40	1.48
	smokers	1.61	1.47	1.55	1.40	1.50
50+	non-smokers	1.49	—	1.35	1.30	1.39
	ex-smokers	1.43	1.30	1.39	1.30	1.36
	smokers	1.44	1.30	1.38	1.30	1.30
All Ages	non-smokers	1.81	1.46	1.49	1.36	1.51
	ex-smokers	1.59	1.46	1.63	1.40	1.52
	smokers	1.65	1.47	1.60	1.40	1.50

standardized to height 1.7 m and ages 25, 35, 45, 55 and 65 for the five age groups using the regression equations of Coates (1964) are shown in Tables 16-20. Table 23 gives the numbers of men who completed the various tests of lung function.

One Second Forced Expiratory Volume (FEV₁)

There is a slight relation to age (Table 15) but rather less than would have been predicted from the regression coefficients on age (Coates, 1964). There is a tendency for smokers to have lower values of FEV₁ and the difference between smokers and non-smokers increases with age agreeing with the findings of Rosner and Webb (1974) in adolescent cigarette smokers. For those aged 50-59 there is a relation to duration of exposure but not at other ages.

Forced Vital Capacity (FVC)

In accordance with the findings of

Rosner and Haines (in preparation) the differences in values of FVC are smaller than those for FEV₁ between smoking groups. As for FEV₁, there is a dose response relation for those aged 50-59 but not for other ages although an expected Sorkin with age is observed (Table 17).

Total Lung Capacity (TLC) and Residual Volume (RV)

Tables 18 and 19 show the values for TLC and RV. Total lung capacity is not related to age as expected, and there is no relation to smoking in duration of cigarette exposure. Residual volume increases with age as expected but is only shown to increase with smoking in those aged 40-59 years. Again there is no observed dose response except in those aged 50-59 years.

Smoking Factor (SF)

A marked smoking effect is seen in Table 20 but there is surprisingly no relation with

TABLE 2. MORBIDITY AND MORTALITY RATES (per 1,000) ASSOCIATED WITH EXPOSURE TO ASPHALT IN THE 1950s AND 1960s

Age Group (Years)	Disease Category	Strategy of exposure to asbestos (Years)				
		1-10	11-20	21-30	31+	All Years
1-10	asbestosis	0.0	0.0	—	—	0.0
	mesothelioma	0.0	0.0	—	—	0.0
	lung cancer	0.0	0.0	—	—	0.0
11-20	asbestosis	0.0	0.0	0.0	—	0.0
	mesothelioma	0.0	0.0	0.0	—	0.0
	lung cancer	0.0	0.0	0.0	—	0.0
21-30	asbestosis	0.0	0.0	0.0	—	0.0
	mesothelioma	0.0	0.0	0.0	0.0	0.0
	lung cancer	0.0	0.0	0.0	0.0	0.0
31-40	asbestosis	0.0	0.0	0.0	0.0	0.0
	mesothelioma	0.0	0.0	0.0	0.0	0.0
	lung cancer	0.0	0.0	0.0	0.0	0.0
41-50	asbestosis	0.0	0.0	0.0	0.0	0.0
	mesothelioma	0.0	0.0	0.0	0.0	0.0
	lung cancer	0.0	0.0	0.0	0.0	0.0
51-60	asbestosis	0.0	0.0	0.0	0.0	0.0
	mesothelioma	0.0	0.0	0.0	0.0	0.0
	lung cancer	0.0	0.0	0.0	0.0	0.0
61-70	asbestosis	0.0	0.0	0.0	0.0	0.0
	mesothelioma	0.0	0.0	0.0	0.0	0.0
	lung cancer	0.0	0.0	0.0	0.0	0.0
71-80	asbestosis	0.0	0.0	0.0	0.0	0.0
	mesothelioma	0.0	0.0	0.0	0.0	0.0
	lung cancer	0.0	0.0	0.0	0.0	0.0

apt to detection of exposure to asbestos in the RAW's men though Harvey, Finch and Wheeler (in preparation) suggest that this value is one of the most useful in diagnosing asbestosis.

Discussion

The different types of work undertaken at the four yards and the different approaches to problems associated with asbestos materials have resulted in different criteria being applied for inclusion of workers into the Register of Asbestos Workers and the comparison to be drawn between the four yards would be difficult.

The data obtained however are of value in establishing a base line for those men considered to be exposed to asbestos and other insulating ducts. Affect many of them in low concentrations and for intermittent periods of time. They will be used in the prospective study being undertaken by the

Employment Medical Advisory Service

In terms of assessment of the effects of asbestos exposure the results of this postnatal report fall between those obtained from the Mass Survey (Harvey *et al.* 1970) and from the study of men more heavily exposed to asbestos (Harvey *et al.* (in preparation)). The asbestos effect of insulating men only intermittently exposed to asbestos into the Register of Asbestos Workers and the medical selection of those since 1960 account for these differences.

The results of the survey show that the selection of these workers has meant that radiographic clinical and lung function abnormalities associated with exposure to asbestos have only occurred in the older men who were exposed before the new protective materials were introduced into the dockyards by the Ministry of Defence (Riley in 1969).

Two Naval Medical Explorers

Ann

WACE

Sergeant Commandant Edward
Atkinson, DSO, DPM, RN



It took him a month, Atch said, to find a man who genuinely shared his insight being only understood in the job at hand, and also because neither Fox nor Wilson said much about him. So, and he never wrote about his experiences and because he had young Herman, in fact three men in one, — doctor, naval officer and Antarctic explorer.

Edward Louder Atkinson born in Trinidad in 1882 was educated in England

at the Fort St John School. He trained in St Thomas's Hospital, qualifying as physician and surgeon in 1906. Incidentally, while in training he was the United Kingdom light heavyweight boxing champion. For a time, he was at the Brompton Hospital, and Charing Cross.

In May 1908 Atch joined the Navy as surgeon. His appointments in the next twenty months were not remarkable. After six months at Rangoon he was surgeon on the cruiser *Arcturion* for six months. Before he was put on the books of HMS *Proteus* as superintending the research. In January 1910 he was put on the books of HMS *Porpoise* for service with the British Antarctic Expedition, 1910 in the *Terre Nova*.

He returned from this in 1913. During the Great War he was with the Grand Fleet, with the Royal Naval Division in Gallipoli and in France with the Hampshire Brigade where, as the result of a shell burst, he, partly lost the sight of one eye. In North Russia he met Sir Ernest Shackleton and Dr E. S. Marshall who had been on the polar march in 1906/07.

In September 1918 an Dover Harbour dock built monitor HMS *Gladiator* caught fire and had to be torpedoed by a destroyer for fear that her magazine might explode. Atkinson's monitor was outstanding. Handicapped unconscious he was rescued and then he brought two unconscious men to the upper deck. When removing a third man he was killed by an explosion and remained in the bay. He

contracted the pain of metal which impeded the movement of his leg and took the man to the upper deck. Totally unable to see, by feeling his way, he received two more men. When released, he was wounded and burned to such an extent that his life was in danger for some time, and his health first impaired by his experience in the Great War in France was further damaged and remained with him for the rest of his life. His action was not known until long afterwards when the commanding officer collected the evidence and recommended him to the Admiralty.

For his earlier war service, Arch had been awarded the DSO, and for his work in the Ukraine he received the Albert Medal.

Temporarily in 1915 he was a Captain in the Royal Helicopter Navy, and three years later was sent with the Naval Mission to Greece. After that he was appointed to the Royal Naval College, Greenwich, Harport, in 1918. He lived in Glasgow in his last year. He died in the Mediterranean, on his way back from India, on 20 February 1929 and was buried at sea. His early death was undoubtedly the outcome of his experiences in the Royal Navy and the Antarctic.

When Arch joined the Navy he obtained the medal for being top of his entry. When he volunteered for service with Scott's second expedition, the Director General said that he was glad that Atkinson and Lewis had been chosen because they were both good men, and their selection would give a 'tip' to the Department at a time when it was needed.

First and foremost, Atkinson was a research worker. At the end of 1906 he went to Holar as necessary, which led to his paper on porcherian rheumatism. He published a series of papers — on a kind of influenza in the Far East for the Colonial Office — on flu in pigs, potatoes and dynamite, viruses and the effects of small quantities of metallic salts on bacteria — all together with a practical purpose. In 1920 he was awarded the Chadwick gold medal

and prize for his contribution to health in the Navy. His work was acknowledged by giving him grade of junior sub-lieut. and he was the first member of the Journal of the Royal Naval Medical Service.

Arch was one of the few out of the hundreds of volunteers who joined the British Antarctic Expedition. He was in fact the surgeon for the main party at Cape Evans under Dr B. A. Wilson, was virtually a non-practising doctor. Since his first medical duties were light, he went also as parasitological, maintaining the original work done in the Outcovey by Dr R. Kesteven; he found a new tapeworm in his Adelia program, and in an Imperator program, new parasites on fish and seals and a trypanosome. His notebooks at the Natural History Museum show him as a neat, methodical worker. Since this work did not take the whole of his time, he also gave help to Edward Nelson, the biologist. It was at his hands as a research worker that he was photographed for *Scott's Last Expedition*.

At Scott's request, Dr Wilson wrote a short report on their scientific work for the President of the Royal Society — commencing as this:

Atkinson, whose work here on the problems of the larger animals will remain a good deal that is new. No one has studied the problems here before, and he has already got several new things both in problems and new and under-estimated.

On the outward passage to New Zealand in the *Terra Nova* he kept a regular watch. On the journey north to the Ross Sea, when the ship ran through very stormy weather, he gave a helping hand to Gales who was looking after the papers on deck. Gales and Atkinson worked like brackles, wrote Dr Wilson.

There was nothing outstanding about Atkinson's clothing in the first year in the Antarctic. In the autumn he took part in depot laying with ponies, but a bad head compelled him to give up. In 1912, in

supporting the polar party, he was in charge of some of the parties, but when they started to fail he joined the main parties under Teddy Evans. At the Upper Glacier Depot at the top of the Beaufort Glacier near the Plateau Scott had the idea that Atkinson was doing well and sent him back. So he joined the Charles Wright party which got back to Cape Evans in just over a month with no special difficulties. They had some sickness and slight worry, but his care and medical knowledge brought them through.

During the winter he had been anxious to leave Ross and could be heard chattering on the main deck with the two Rossan parties. His literary ability was not well developed. His contributions to *The South Polar Force* were. 'Coldest of the ice is glass house', 'Eskimo from time to time', 'An Arctic adventure' and a short comment on 'The Eastern Party'. They were not particularly good.

In 1913 when the three Ross took back most members of the expedition, Atkinson became the officer in charge — almost by default and agreement. Harbison and Agley Cherry Garwood with one man to One Ton Depot to meet Scott's returning party. When they came back unsuccessful Atkinson himself set out with Petty Officer Patrick Keohane. He only got as far as Center Camp when unbearably low temperatures forced him to turn back. He was morally certain that Scott's party was dead.

Atkinson was not in an especially positive even had he been back and he, but he had just come back from a Gudge journey of nearly 900 miles. Almost all his energies and responsibilities Cherry Garwood collapsed. Atkinson looking after him with the greatest patience and care. Nothing could have succeeded his kindness and his skill with the few drugs we possessed. Cherry Garwood died many years later. He had already paid managed to save the life of Teddy Evans who was critically ill with scurvy.

Like Frank Wild with Hanson's party Atkinson managed the Cape Evans party by default. The spirit of the party was high in the dispensing circumstances. Before the winter made travelling impossible he called the members together and got their agreement to make an attempt to relieve Campbell's northern party. They walked without snow and provisions to Terra Nova Bay, a journey that could not be carried out. It was Dr (Sergeant) Commander George Murray Leckie who brought that party through the winter in good shape.

Before the spring of 1913-14 Atkinson was faced with a dilemma: either to look for Campbell's party (who were on their way for nearly three months) than to return and, or to look for Scott's party. He decided to look for Scott but immediately refused to be rushed into a journey too early in the season. The story of how he found the ice and the bodies of Bowers, Scott and Wilson has often been told.

When Campbell's party managed to make their own way to Cape Evans Atkinson handed over the responsibility that he had carried for almost a year. His work was recognized on his return home by his promotion to Surgeon Lieutenant Commander.

Cherry Garwood was wrong in saying that Atk was a specialist in scurvy. Before the expedition he knew as much as the ordinary qualified man — and before coming did what he could to read up the subject. Looked at today his was an extraordinary intervention. He was under the influence of Albrecht Wright, and Atkinson's task was that he learned too heavily on the medical literature ignoring the experience of previous polar expeditions. Possibly he did not have sufficient time to prepare, as his appointment to the expedition dated from the day the ship sailed from London.

In his letters to Cape Evans at the first winter he attributed the disease to increased acidity in the blood arising from limited food, over-exhaustion and bad air and

light in a month he suggested fresh vegetables (particularly onions) and lime juice. It is too many to his day to serve not to have been aware of the difference between lemon and lime juice. He had little faith in fresh meat, thinking it too cold, whereas the climate did on fresh vegetables was helpful. He had no idea that sodium bicarbonate was a useful drug and that Plummer left a change of diet was useful.

Somewhat stronger is his reaction to the death of the polar party. Though overt symptoms of worry were not to be found in Scott's journal and the silence, it is evident that their failure was due to that disease. Yet he would not admit it, maintaining that Teddy Evans was the only true man, and that the polar party had died of starvation and exposure. The King-Macdonald who with Shackleton four years earlier had made a similar long Arctic journey was convinced that worry had been a factor. In fact, he had turned the disease. He met Atkinson at the School of Tropical Medicine where Atch was working on his Indonesian. Atkinson denied indignantly that Scott's expeditions had suffered from worry, and after some discussion avoided Marshall. They met again in North Russia when Atch was procuring ice-scurvy to Col. Thompson. Marshall challenged him on this point again, but found Atkinson still of the same opinion. It may have been largely to Scott that made it hard for him to discuss the matter rationally.

In North Russia, where Atch gave considerable help to various of the Bolshevik revolution, there was another happening not in keeping with his character. When on the ice Shackleton recalled Russia as a soldier, he found that he had been preceded by the reputation of being a difficult man to work with, an opinion given by one of Scott's men. In fact Shackleton's supervisor found no great difficulty in working with him. The only man from Scott's expedition on that front was Atkinson. Perhaps that is an indication

of the strength of feeling between Shackleton and Scott's men.

Atkinson described his work on the Antarctic in five short chapters in *Scott's Last Expedition*, with a medical account in the *JANET*. Regrettably he did not write a full account of the second year, nor did anybody else. He was one of those who did not get lost could be certain of his mortality. His main interest lay in doing the job rather than writing about it. He was tough and realistic. Even in the first year he was lost in a blizzard for some hours and Cherry-Garrard wrote:

He ought to have been there into hundreds of hard years. But always the same steady endurance half its years up again. I have seen it with the same tough elasticity which reflects in his face that there is the same quiet voice is resilient for the next and with you have experienced every body was caught during it.

Charles Wright, who was physician to Scott's Terra Nova expedition, saw the polar party up to the Phoenix and in the second season was in the party that found Scott's tent. Of Atch was he said:

Atkinson has never recovered any credit for that cannot stand quite words that a terrible decision to make a very good deal.

The dictionary defines *conscience* as his five character, solid, dependable, and real power of leadership. Teddy Evans made the rather obvious point about guilt and loyalty being his outstanding qualities. The words that Shackleton said about him — not much talk but much full of grit — could equally have applied to Atkinson. Indeed on the last in Cape Evans he showed a close relationship with Messers and Dimes, but a close relationship with who was not given to talking.

Acknowledgements

The friends of Dr Eric Marshall have been opened by kind permission of the Scott Polar Research Institute.

OLD SPORT

Surgeon-Commander George Murray Leitch, RN

George Murray Leitch is now best remembered for his work on the Antarctic in Scott's second expedition on the Terra Nova in 1910-13. In his lifetime, he had three careers: for some twenty years a naval surgeon, for twenty years a leading figure in youth training, and for three years an Antarctic explorer.

In his published journal Scott's sole comment on Leitch was on his incompetence in his unpublished diary Scott made some more pointed comments:

I am told that he has some knowledge of his profession, but there is such a heavy weight upon his shoulders of knowing anything, that I am sure I could believe he would do nothing from sheer lack of courage.

Scott noted Leitch's persistent cowardice, and his remark under adding that he cheerfully accepts any amount of shell. In short, he said, "I am afraid there is little to be expected of him." Before the Terra Nova had reached Melbourne from the Cape, Scott had changed his mind slightly. Leitch has a really charming nature. Such comments were largely a reflection on Scott's poor judgement of men, but were partly due to the fact that Leitch was a retiring student man content to do his work without making much of a lake. Additionally, he seemed to be overlooked because he chose to stay in the background.

Leitch was, barely six years old when he joined the Royal Navy as a surgeon. He found his work he could give to the service, and at last became a specialist in physical and recreational training. At last he served abroad, and then for the greater part of a year on the Halford, flag ship of the Mediterranean Fleet. Then at the Queen and at the Naval Hospital, Chatham. Since that time two appointments which gave the special turn to his career. In 1908 he was

appointed to the leadership. Leitch was promoted by Captain R. P. Scott and in the following year he went to HMS Glasgow as medical officer with special responsibility for physical training. He was a keen rugby player, a good one and a magnificent gamesman with an interest in training, and a keen medical officer for a boy's training ship. Partly as a result of his time at the Glasgow he wrote about Leitch's system of exercise.

When the Great War began, he was supernumerary in the Home, in the next four years he served with the Grand Fleet and at Gallipoli, being given special promotion in 1915 and promoted to Fleet Surgeon in the following year.

For twenty years between the two wars Leitch was at the Ministry of Pensions Hospital at Shepherd's Bush. In the purely medical field even though he was a pioneer of ultra red treatment, he did not make a great name for himself. In all probability he did not want to do so, his main point was that his work was in the right place, and he had a healthy, cheerful approach to the work.

In the 1930s his interest in training led to The Public Schools Exploring Society which he founded with the help of his wife. This led to annual expeditions, from 1933 to 1939 first at all to Finland and England and then to Newfoundland, with as many as 70 boys at a time. Even though he was almost seventy years old at the time, he led the first post-war expedition to Newfoundland. In all he took some four hundred boys on expeditions in which they learned something of leadership as well as doing a constructive job. Many of these boys later took part in exploration. He published *Young Pioneers in Northern Finland*, an account of his second Public Schools Expedition in 1942, the Royal Geographical Society (R.G.S.) gave him the

Back Award for this work.

Another aspect of Lervik's interest in helping young people towards physical fitness was his work for the Chantry Heritage Schools.

When the war began in 1939 Lervik reported the Navy much of his time being spent in treating Commandos for survival in extreme conditions. His lectures to Commandos and others were published by the War Office in 1942 as *Some Notes on the hardening of men for Warfare*. On the medical side he had already published articles on clinical otitis, nerve strain and the therapeutic value of red eyes. His time in the Falkland and the Glaciers had led to an article on *Being Sick of the Adrenochrome* (1941). His most interesting task in this last war was in 1941 when he shared on a plane for having two men walked on while the Rock of Gibraltar should not be taken by the enemy to stay there for some years of need. Part of his time was spent with the Naval Intelligence Department.

It was when he was serving in the fleet with boats that Lervik first had his thoughts turned to the Antarctic, but at that time Scott's plans were only tentative. In 1939-40 when Scott's plans were maturing, he asked the Admiralty for Lervik's services. The Director General of the Medical Department said that he was glad that Lervik (like Addison) had been accepted for the expedition, as they were both outstanding men, and it would give a ship when it was needed by the Department which was then under training.

Scott's plan was to have his main base at McMurdo Island for his dash to the Pole while following Shackleton's (1906) he proposed to have a base under Victor Campbell in King Edward VII Land which he discovered in 1902. Like Shackleton the Western Party found it impossible to make a base there, and in order to avoid returning home empty handed they became the

Northern Party, setting up their base at Cape Adair in Victoria Land.

Eleven years earlier C. E. Shackleton had found it impossible to get inland from Robertson Bay, so to explore the coast, and Campbell's party found themselves in the same position. They added little to the map. Besides his medical duties, Lervik was the party's photographer, made biological and stores of food. His photographs did not have the artistic qualities of Herbert Ponting's — very few men could have reached that standard — but they did provide a good record of that part of Victoria Land.

In such a small party, Lervik's medical and store keeping duties were light and he was able to have his attention to natural history. Their base at Cape Adair was built in the middle of an Adelia penguin colony — so much so that he had to put blurring powder down before the floor could be laid — and since the first journey had been completed, so Shackleton's party were —

already Lervik had started a series of systematic notes which are probably the most thorough that have ever been made on the Adelia penguin.

James Murray Shackleton's biologist at Cape Royds in 1907/08 made some notes on penguins, then the first study of the birds in individuals. Lervik did this in much greater detail. The results, very well illustrated, appeared in the expedition scientific reports, in the *Natural History of the Adelia penguin*. And in 1944 Lervik published a book *Antarctic Penguins*, which still stands as the leading popular account of these, again, very well illustrated by his photographs.

In the second season, in 1942, Campbell and his party were put ashore at Terra Nova Bay for a short summer exploration, to be picked up by the *Terra Nova* after a few weeks. The ship could not reach them, and they were forced to spend the winter there, in (presumably) inland, with almost nothing in the way of stores and equipment.

NORTHERN PARTY AT CAPE ADARE



From left to right: Walter, Campbell, and Dr. Llewellyn.

Llewellyn, Walter, Campbell, Dr. Llewellyn, Dr. Llewellyn, Campbell, and Dr. Llewellyn.

For seven months they lived in a cave dug at a snow bank, with just enough floor space for six men and their sleeping bags, but not enough height to stand upright. In the absence of heated foods the party was compelled to live largely on seal meat cooked on a primitive stove, thus keeping warm at bay. With one man so sick that it was doubtful if he would live, and one man mentally deranged, Llewellyn had to use all his medical skill to help Campbell in tending the party through the winter. Walter Campbell imposed strict discipline, but relaxed it to the extent that there was a lull down the middle of their cave, and it was understood that what was said on one side would not be heard by the other. But the discipline and influence of Priestley (the only civilian) and Llewellyn helped to take the sharp edge off

the rigid discipline. At all events when the spring came, they were all fit enough to make their own adventure by marching two hundred miles to Cape Evans, even though one Army Officer remained detached.

Even at these extreme seasonal changes Llewellyn still had his scientific method interest. In midwinter he tried the experiment of living for a week on seal meat and nothing else. He went without beer, chocolate and sugar. Four years later Shackleton's Ross Sea party had to live on seal meat alone for some months, but in 1912 it was an untried question.

Llewellyn can hardly be described in this story. Walter Campbell's chapter is the expedition narrative; was only a report that said little about him. Priestley, who was with him for the whole of the two years,

wrote at length making little other than factual comments — Franksy was like that. The small and isolated party was seldom in touch with the main party and they seldom referred to him. Dr E. A. Arkinson wrote a flippant paragraph in *The South Polar Times*.

The Eastern Party *Mr Doane and Shackleton* was a famous man. *Balanced of countenance and renowned in the world of sport, also in war and art but war is known by him a magnificent fund of anecdotes the aptitude for photographs was marvellous, as the Court records will show. Mr. Huber was an artist. Like a publisher he acquired articles and had them and then forgot all about them.*

There are few of the Southern Party who have not drifted from the forgetfulness.

The name of the Doctor George Thomas Leach or *Chief Engineer* as he was very familiarly called.

The last comment came from Leach himself writing home about his colleagues: *a splendid lot of fellows, without exception who got on very well together. A collection upon himself.*

Leach died on 25 May 1954.

Acknowledgements

This note on Dr G. M. Leach owes much to help from Miss M. Bailey his niece and to Mr Robert Leach his son.



received a severe blow on the head from a watch and an X-ray was therefore indicated. We were all stationed at the time so I took the case by ambulance on the helicopter 80 miles to Cagliari where all transport arrangements failed as no signal had arrived regarding the arrival of the helicopter. Eventually a Tilly was found to take us to the Military Hospital arriving at 1600 Friday, where we were informed by the Staff orderly that the X-ray could be taken until Monday! We then went to the local civilian hospital and at last found the X-ray Department where films were taken after payment.

During our return flight to the ship we landed down at a Royal Italian Commando unit working under orders in the S. Sardinia movement.

Naples

The International Consulate was not visited as the ship was lying out in the Bay without much transport available.

Rome, Capri and Pompeii

Visits were carried out with much success including being present at the appearance and blessing from H. H. the Pope from the Vatican overlooking the Piazza S. Pietro. No contact was made by the Base of 5940 Southern Europe although we were the only British ship at the time. Fortunately I am able to speak Italian and French to a limited extent and this was found very useful — if not essential — when carrying out a RAS with NATO ships. Both French and Italian were very friendly over these meetings and good rates were exchanged for fuel oil.

Malta

Our patient was sent by helicopter but via a long way from Grand Harbour and it was not possible within 48 hours to pay a visit to the Principal Medical Officer but our last was made with the eye specialist.

I walked round RMH Eight (where I spent 3 years) in ENT Specialist in 1940-46 and found it so near a school and very dilapidated. There were ping pong tables in the church and the Jaycock Room Admiral's garden and there was a mass of rubble although after the bombing in 1942-43 we had made the garden beautiful again.

Vella Porcella had been painted pink by the artistic touch of Admiral Tompkins Cairdell (He was Flag Lieutenant RNVR on my day when we were sent over from time to time to the Commander in Chief's aircraft to help to load and bring back wine for Admirals Turle and Dalrymple Hamilton respectively).

The Palazzo Dragone is now a mass of expensive restaurants and a casino. A considerable change from the modest days on the private residency of The Marquis Scialoja and his two brilliant daughters in the Island of The Pomegranate, with whom I had the pleasure of producing a *Schubertian Score* in the Palace Gardens many years ago.

President Garibaldi was visiting Mr Marcell and I saw him taking the salute when he said "All Maltese should say their son with the word as the colonnades had never given them anything and only wanted them as a war base etc."

Police here are very complex and when I visited old Maltese friends they explained that in these squares.

Off ships were not welcome in Grand Harbour.

US ships were permitted but American on influence.

USSR naval ships were not welcome although their merchant ships often covered by women all with cameras and film alongside Ash Rigal on my previous visit to Malta.

People's Republic of China were very welcome and one thinking a day took out down back an excellent road round one.

In Luzzara I met the naval officer who

had the depressing duty of turning down the Royal Navy and saying that they were all out of Malta by 1877.

The Malta Club is now solely Maltese. The Valletta House Club is a museum and the Sports Club is entirely Maltese and no arrangements are possible for temporary membership for officers on visiting ships. This the Secretary told me personally although I was a member in the past. The club is an amenity but the problem and the Malta courts much improved.

Prices in Malta seemed very reasonable and there were many English tourists but there are serious same-day tailors for white uniforms etc and the Green House is still not rebuilt. There is a new pity being built at Malta for Green House and the lack of it at the Malta Hotel and Paradise Bay close by are excellent for families.

Blackburnes — Sea of Marmara — Bosphorus — Black Sea

This was an interesting run through the Greek Islands in a glorious sunset and picking up the Pilot off the tip of the Gallipoli Peninsula in view of the Turkish and British War Memorials of 1915/16 and crossing against the 4 knot westerly current into the Bosphorus and passing Istanbul and up the Bosphorus which is beautifully wooded with villas and small houses and rather reminiscent of those of the Rhine and on to the Black Sea where we drifted leisurely to me up was before a number with 30 minutes from Odessa returning to Istanbul. The new suspension bridge across the Bosphorus connecting Europe and Asia was a fine sight as we steamed towards it.

Istanbul

The ship lay out in the stream about 12 miles from the Cadiz House Wharf but a boat meeting me arranged. Vans were taken to the Old Sultan, Police and House of the Harem at Topkapı but the Treasury was the most interesting with quite fabulous profits beyond price. All on view without

much in the way of security. Lunch on the battlements looking up the Bosphorus was very pleasant. The Blue Mosque and S. Sofia are of course sites of great interest, the latter which was an early church, is now a National Monument. The Galata Tower gives a good view of the city and the Golden Horn is full of small busy steamers coming in all directions and large boats coming and going. Under the Pontic Bridge are the famous Fish Restaurants. The house is quite fascinating as is the fruit market, and anything can be bought from excellent jewellery to leather coats, glass and copper and with plenty of bargaining but a hard by all.

The Golden Horn is quite filthy with pollution from shipping and the city streets are the same with rubble and rubbish everywhere and the public lavatories are most odious. There are very few cafe restaurants which are clean enough to use other than those of the Harem and other very expensive hotels. An excellent view of Constantinople at 10 km a boat. The city is much more poverty stricken than, for example, Naples and it is remarkable to see the sight of beggars carried on the back and drinking water being sold out of tin cans in the streets.

It was not possible to visit either the American or British private hospitals owing to lack of transport but one of the Government hospitals was visited and lunch provided by the residents and I was very courteously treated by the Canadian Physician speaking French.

As in Naples no contact was apparent from any official person on our arrival and the Consul later said he had no idea the ship was visiting. But this is usually the case with the RFA in the absence of an RN ship.

A Russian helicopter carrier with 3 destroyers and a submarine passed close by and dipped and I also went aboard a Russian liner where things were operating in close and organized.

Shops in the markets were traditional wooden houses. There were old carts and a few very large, very old cars along the narrow cobblestoned market streets. At the end of May the houses were laden with strawberries and cherries at 30-40 pence per kilo equivalent.

No signs of either development or development was seen.

In the palace as seen of additional interest was the ecopial of St John the Baptist. Fossilised and stone included superb examples of Ming, Ching, Shao and also Fossilised Vases and Fossilised Rose. The garden partially kept contained beautiful roses and a very old rose in full bloom.

Memorials of interest over the mountains and the view of Fossilised Mountains in Chinese Mountains and the new bridge joining Europe and Asia over which all continue to live passed in the Road - will passed with the memories of the Turks as a door but very police people living with very considerable poverty in the streets.

Constantinople, Romania

June 2nd

MMT Government received the local and received a salute from the shore battery. The First Medical Officer came aboard a ship which he to drink our Queen's Health as it was his birthday! We drank to his President. There were no problems were First Regiments and no parties were needed. When passing through the dockyard gate armed guards asked if we were English and passed us through without any questions. It was a genuine early had commercial port which could handle vast numbers of tankers with offshore rigs etc. We went ashore in civilian clothes although Romanian officers and ratings were uniform while in Odessa where good houses were owned and by the sailors reaching to beautiful Russian girls on the ship as sailing.

In Constantinople the one Chinese Hotel was expensive and no gambling allowed. The boats and drink were very cheap but

everything else including taxis were hard prices. No private firms of any sort exist and collective farms, railways and houses are all State owned and the puppet incomes to the same socialist pattern. They are building up a tourist trade with many new hotels outside the city where there are good roads. The one hotel we visited for a meal produced very nicely cooked Danube fish and state brewed milk. There was expensive. Two restaurants were underdeveloped one being in Bucharest which I did not expect underdeveloped but reports told of a city with no great tourist attractions. Sadly since the war the city has been devastated by a very severe earthquake.

No real poverty was seen rather in the cost of the cinema and this was in contrast to Istanbul where beggars and mutilated warships abound.

The Danube Delta was reached by land car with unfortunately no time so hard to explore the local resources although houses and a state were seen. It is an archaeological paradise resembling La Comarque in Provence though much more extensive.

Many boats including a public row boatmen were seen. Taxis were mostly German and Romanian but the second language in French. Romania gave a very good medical party which was attended by all the local dignitaries and the British Naval Attaché and Consul from Bucharest. The Ambassador from Moscow came down to Odessa to meet Devostnikov. On the last night the Romanian Admiral gave a party with champagne or cognac or wine and in the cognac was served next to large dinner it appeared as excellent also when cups of cold water were also handed around. Vice Admiral Moroz (POW) replied to the Turkish by submarine and a general general atmosphere persisted throughout the visit.

A visit to the local hospital was made by the medical officer of Devostnikov but as

lost sailed earlier. The Romanian doctor (naval) spoke very good English (learned in their schools) and the Port Medical Officer spoke good French otherwise it was Romanian or some language (Italian is slightly dead).

Foreign direct Black Sea to Gibraltar. Moroccan (Italian) - (Pernault) June 12 arrived at Gibraltar in good weather and (Pyl) (my wife) was waiting with two other men. We had a few delightful days in Gibraltar visiting day resort and staying at The Rock (very well-known hotel). The days were more expensive than before. The Officer (Queen's) Berthelme (Pernault) was very good and the Governor (RAF) took the salute. As our last part of all had been to a Portuguese country (Romanian) this part was very interesting and at the top of Gibraltar were just British.

Atlantic Review

June 19

In Royal Fleet Auxiliary Office we were based for the Isles and the Navy's Navy Cadets and were approximately 1,300 miles east of Gibraltar in heavy weather when the ship's (main) overboarded and engines were stopped. Later the decision was made to return the rest to the States and to return to U.K. with my assistance from Plymouth. On the same day a yacht was sighted less than a mile distant sailing under a jay rig with no mast and one occupant. Course was immediately altered to close and the German (main) way which proceeded to the damaged vessel but unfortunately the ship's rubber ball punctured in the yacht's side and it was recalled with the information that there was one Frenchman aboard. The yacht (Hilary) had N was eventually stored alongside in the Frenchman's side flying the French flag and carried signal. He asked the jumping ladder without help and I took him some drinks to drinking a hospital. I carried him in a hot tank and passed to his family.

The yacht was found to be too heavy for our loading gear and it was then decided to take her in tow. During this procedure in heavy seas the engine room contacted the main engine and several times of rope broke the rope (propeller) and caused it to fall in. A First Air Arm down went down and loved the ropes and the Captain then decided to cut the party (yacht) as it was a danger to the ship's own movements. Our helo pilot asked permission to make an attempt to remove the yacht which was now drifting free in order to take her in tow once more when it broke. He lowered a man by rope on to the deck of the yacht and made her a wire cable. Towing was started and the yacht appeared to be undamaged apart from the mast but the previously hoisted to and others were given to cut her (yacht) the helicopter was recalled and we proceeded on an easterly course at 7 knots. The same day another wrecked yacht a restaurant was sighted equipped with no apparent occupants.

The yachtsman soon recovered but was desperately anxious about the loss of the yacht which he thought might not be covered by French insurance unless it was actually seen to sink. (In fact my information is to say that the ship have been picked up later near the Dutch coast - unknown).

Survivor's Story

Hilary of Boat 12 L264 30 ft aluminum mast 75 feet aluminum crew From Newsletter (Hilary)

We was 1,300 miles out and he thought well placed in the 19th Frenchman's Race when he was suddenly hit by a Force 12 storm and was immediately damaged and then rapidly exposed until the next gust. However the yacht righted and he managed to cut down the mast but when immediately a further gust exposed her again while he was trying to start motor under the other engine and he was the one on the



The wreck of *Whitby* off the coast

back of the mast when the heavy dingy made
hastening down astern. Once again she
upheld and he had commenced pumping
when a third intermediate part landed a
third engine and as he told me he
perished in the surge and was over the
side swimming alongside the upturned hull
with 1,000 miles to go in the current land.
To his amazement she again upheld and by

shortly afterwards he saw her managed
to climb up the upturning gear and get
aboard again. After continuous pumping he
managed to get a hold on the two sparrows
down and set a course for Europe.

He had sailed for 3 days and covered
nearly 500 miles owing to loss of engine
power and having used he was upheld by
Olan.

The injury to his neck was considered to be a probable crush fracture of the cervical vertebrae and this was confirmed on arrival at RMH Stonehouse where, after X-ray and the fitting of a collar, we called the French consul and arranged to fly him back to France.

The survivors of the *Transatlantic* have owed her life to the supreme effort required to climb aboard her and stowing gear and demonstrating that there is an intense determination at the human body and mind to survive under what may

completely impact out by an earthquake in 1788. There is a floor suspension bridge. The street on all cobbled and winding in the old part and there are several fine churches but the most interesting one is the old Castle on the hill with all its mass of ramparts. High up in the centre of the hillside is a collection of small ponds with wild birds of all types including flamingoes and golden plover. There are superb views over the city and Tapan from the ramparts. The Maritime Museum has a beautiful collection of model ships and uniforms and paintings depicting the developments through the ages with special reference to Vasco da Gama, Cabral and Henry the Navigator whose tombs were in one of the large churches. The Royal Barge are in a special compartment and the most striking one with models of the 160 command who rescued Queen Elizabeth II, and the Duke of Edinburgh on their State Visit is of special interest.

A response by the Naval Attaché was enjoyable, followed by a tea fish supper and local wine with officers from *Amara* and *Charybdis*.

Next day we took to top up oil from tanks on the Algarve side of Tapan.

Friday December 1st

Took boat to *Ark Royal* lying close by out at the stream and was given the drugs required by our ship and wonderfully contributed to lunch by the FMO and Chaplain. I then returned to Olva to find at 1530 for tomorrow in the Gibraltar area, Malta and the Canal and so to Africa.

The weather in Lisbon was warm and showery. High spots were the visit to the castle and museum and the sight of the numerous statues of Christ with outstretched arms on the south bank, and the one of Henry the Navigator on the North bank.

Saturday 22nd

After leave I resumed the ship at Oporto on passing rain. Next day we sailed but turned out into the North Sea and provided much to Dutch waters to encounter with and RAS *Joseph*, *Amazak* and *Charybdis* who were leaving the recent RASTI deployment. We then turned south at 21 knots and passed down the North Sea. There and the Western Approaches without seeing land owing to a pressure mist. In the night a slight collision was reported between two ships which was not surprising with greater traffic in the Dover Straits.

We had transferred the Staff Officer Operations etc. to Olva and moved to Admiral Horton (FOFI) in RNS *Joseph* who was going to Amsterdam and replacing us at Lisbon. Later we transferred the staff by helicopter to RNS *Devonshire* and proceeded south across the Bay of Biscay 17k SW but on arrival at Lisbon on 28 September the weather was fine and the sky was blue. During the previous day *Devonshire* had a boiler explosion and limped into Lisbon. On Sunday afternoon we were met by *Amara* in varied weather conditions.

Lisbon

Lisbon is most picturesque in view from the Tapan and consists of an old part and a modern city. The original city was almost

Lisbon to Marseilles via Malta

We found better weather as soon as we

left Lisbon and the southeast and the change to winter was very acceptable. We sailed through the Straits of Gibraltar without calling, although the helicopter went in for stores. We then met up with a great sight of the American 6th Fleet and a few Portuguese ships but the French were not visible in our mirrors at NUTU. The *AGF Monaco* 41,800 tons and *DSE Amance* departed Ark April 30 1969.

Three wire packages 40 ships and photographs were taken from the air. We had the Portuguese Chief Commodore on board, who took over my cabin and was so comfortable that it was difficult to change him to return to his merchant ship, which was very small. He was interesting but his flag had the better English and we heard many interesting facts about Portugal under its new regime (after 40 years dictatorship). He did not think the present government would last long as there were so many parties, all conflicting. The country was poor and only had a few old ships.

We duly sailed into Great Harbour, Madeira which was so beautiful and impressive to enter with the morning sun on the rich Madeira scene of St John St Angelo, Lawrence the Flaxman and Right. I managed to get through to the telephone system just as the (paranoid) doctor told us we were to land there and to go on again.

We had two more days although the rain came but we visited old houses at Funchal, Milena, St John Palace and gardens, the Museum, Club, Funchal Palace and the Cathedral of St John and St Paul.

We sailed next day and eventually rejoined the convoy as we approached Port Said where we lay at anchor 7 miles offshore till 1400 when we started to traverse the Canal. This was interesting. We saw considerable military works and used several harbours manned by the Egyptians and some hundred houses, and near the hospital at Ismailia which had been dominated by children. We followed a a

mainstream in the Bitter Lakes and then having changed plans, proceeded in a convoy (about 7 miles north) and cleared into the Red Sea passing Suez by night where all ships displaying convoy markers. The shore lights were very impressive. The Red Sea was very hot, shade temperature 95°. I visited the engine rooms where they were at temperature 125° and perceived most odd tables. The air conditioning partially failed when we were blocked out for the morning and our cabin was 95° day and night. We did not see Aden but passed out into the Indian Ocean with a night of cold and a breath of fresh air. We were still in convoy with the RN frigates and saw the French frigates and 2 French lighters.

Manila

We entered harbour in company with *Ardenburg*, *Yarmouth* and *Charybdis* which went alongside while we moved out to the stern. Boat trips to the old breakers dumps were somewhat hazardous.

The official cocktail party was held on the 3 frigates together and was a great success after which we dined at the *Manila Club*. This is still a good club at sea — the general atmosphere, food (8 courses for £2) and the service is excellent — and dining out on the open terrace overlooking the Prime Time Club by full moon was unforgettable. We were later delightfully entertained by the Kaysa Navy and their crew.

The *Sanborn Beach Hotel* a small family type gave special rates for my Naval pensioned and was very good value with excellent swimming in the lagoon and cheap a sandy beach. There was a small garden full of exotic flowering shrubs and a well kept clean swimming pool. They also cater for children.

We visited the *Manila Military Hospital* and met Dr Cameron (then who was the Medical Chairman with Dr O. Keith the surgeon. This is a good hospital and extremely

cigarettes, and Dr Cunningham recommended both the one and dental operations a delightful open air toilet supper at Dr Cunningham's home was much appreciated.

My next post Otha in Mombasa and my wife and I stayed with friends on the lovely slopes of Kilimanjaro and were shown out by the Royal (Military) Airforce at his beautiful official residence in Nairobi. After leave I was appointed to RFA Amoyang for a short trip. I posted to South where there was none and it was fairly cold after Mombasa. We discharged one patient in Chikuma where Surgeon Commander Peter Wood was very helpful before seeing Mr Gordon in Kati.

There was a Race 3-4 in the North Sea where we carried out a RAS for Sussex and Chiswick before reaching the Red Coast which was clean offshore and did not incident look anything without any delays. The Baltic was calm and cold.

Karlensund

This is the major naval base in waters as cold as the Swedish ports in the Baltic freeze up. It has a most excellent Maritime Museum and tends to live on its historic past when Sweden was a Great Power and owned much territory which is now part of Finland. Their Navy is now much reduced with only a few destroyers and frigates and a small number of submarines. It is an interesting fact that their first battleship was built around 1900 and was entirely financed out of the pockets of the people — partly by voluntary subscriptions — and not by the government of that time. The town of 30 000 people is very busy indeed and has a reputation for its concerts. It was built on about 30 islands which are

connected by causeways and frequent ferry services. In the winter when the waters are frozen they are crossed by skis. It is a wonderful yachting area in summer and the Harbour Master is an enthusiastic international yachtsman.

The hospital is very modern and large partly with 700 beds. The consultants are numerous and are traversed by scooters. Two patients were sent to the hospital for X-ray etc and one admitted with acute hepatitis requiring blood transfusion and moderate suspension was recovered. Three under leucos were seriously running Myocarditis mortality when confirmed cases.

The object of our visit to Sweden was to accept back one of our Midget submarines which we had sold to them for training purposes. This was carried off without any incident.

We gave a cocktail party on board and all senior officers in the Swedish Navy who were on Port attended and the Naval Attaché Commander Hans Newstrom for a time Stockholm had dining in the dining room took leave in Sweden this was a relatively sober affair. We were also invited by the Captain of the Port to a luncheon party in the Naval Officers Club and were well looked after by a young Swedish naval officer. The town was busy German and Russian tourists in the summer as it is an ideal vantage point for sailing.

We loaded the Midget Ship in a Wharfed on December 13 and then sailed directly for Plymouth where we arrived without incident on 20th.

It is hoped that this extract from my Medical Journal may record some of the work of the RFA in one and maybe suggest a second career for retired surgeons from the Royal Navy who has not had through a helpfull of our time.

Medical Standards

The basic medical standards required by all Western European countries are similar and appear to fall into a similar pattern as that of the Armed Forces. In the United Kingdom, medicine, with a history of diseases inspiring marines in any form (epidemic, tuberculosis, coronary thrombosis etc.) are not permitted to serve at sea. Other diseases are dealt with on the merits and severity of individual cases.

We in the United Kingdom consider that no mariner should have a medical condition that will cause trouble during a voyage and that the required treatment will not give rise to side effects. Further, it is considered that a mariner should have a medical condition that will deteriorate to an extent that he would be unable to carry out his duties. It should be remembered that in these days of automation and electronics, meaning the sickness of one man may well place a burden on his shipmates. This poses the place to discuss the possible medical problems that could be associated with operations involving such a diagnosis.

The medical standards are decided by the General Council of British Shipping in consultation with the medical officers of the shipping companies who employ their own doctors, and in consultation with the Union. They are reviewed at regular intervals and amended as required. In the event of a mariner being found unfit for sea service he has the right to appeal to a 'Medical Appeals Board' and in certain cases to an 'Industrial Tribunal' if he considers he is being unfairly dismissed.

In the United Kingdom all interested (registered) mariners have medical examinations on entry and on re-entry. These examinations are repeated at five yearly intervals up to the age of 40 and then less yearly. These intervals may seem to be on the long side but are longer than in any other countries under review. But a survey of medical services under a GCHS scheme for the years 1973 to 1978 shows

that the majority of diseases do not become apparent until the fifth decade of life. There are of course exceptions which need not be elaborated in a medical paper. Visual standards have a not very important lead down by the British Armed Forces whereas the medical standards are a Code of Practice adopted by the larger part of the industry. Here it should be made clear that medical examinations and the medical standards (other than visual) are not obligatory to non-licensed mariners. The attention of the Department of Trade has been drawn to the unsatisfactory state of affairs and it is anticipated that the problem will be rectified in the near future.

Responsibility for Medical Care Overseas

It has always been the practice in the United Kingdom, as with other Western European countries, for the responsibility for medical care on ships at sea to be created in the Dock Officer under the Master. All medical instructions, a declaration of the various sea sickness (SS) as well as a broadly arranged as follows:

1. First Aid Course of 12 hours during 2nd Mate's Course.
2. Repeat during 1st Mate's Course.
3. Medical Aid Course of 16 hours during Master's Course.

These courses run by 20 months always 'on' courses and are often given as hourly lectures or demonstration once a week.

As a result of my visits to Western Europe it was found that the United Kingdom was lagging behind most other countries in its medical training for ship officers. The MINACA is now pressing for a two week and on course part of which will concentrate on First Aid, but the larger part on Medical Aid. Both these courses will be based on the 'Ship Captain's Medical Guide' of the United Kingdom and will include eight hours of practical work in a hospital casualty department. It is intended that the new officers grading of *Passenger Chief Steward* shall be included in the two week

leader and all other officers to attend the First Aid courses of the Medical Course. An examination will be held at the end of the course (in progress).

The GCRS at Liverpool run an oral and medical course similar to that described in the above paragraph. It is hoped to introduce a similar course in London and to have possibly phase out medical courses in the schools.

As already mentioned, medical training is based on the *Ship Captain's Medical Guide*. Complementary to the Guide is a list of medicines etc. issued by the Department of Trade which all British merchant ships are required to carry. This list is very similar to that of naval vessels not carrying medical officers. The UK requirements are also very similar to those of other Western European countries allowing for the special preferences of individual nations. Some countries only have drugs dangerous etc. with a number as well as their name in order to facilitate ordering and for use at trials and. We in this country prefer to use the name only without a code number as mistakes reduce their value.

In common with other Western European countries, the United Kingdom holds courses in survival under the auspices of the Merchant Navy Training Board (MNTB). A new syllabus has recently been introduced which includes lectures on the medical aspects of survival with blue and pinked training with inflatable rafts in water tanks as in the case for in Helicopter.

Health and Safety at Work

The movement of chemical and poison substances by land, sea and air is becoming increasingly important especially in the risk of oil spill trials. The majority of chemicals carried are relatively harmless but a number are highly toxic and most have no known antidote. The problem is fully appreciated by ship-owners and most ship-owners.

Over the years the International

Maritime Commission Organisation (IMCO) has introduced a code of practice for handling chemical cargoes etc. and given instructions in the case of an accident. This IMCO documentation is additional to national documentation such as the United Kingdom Blue Book on the carriage of dangerous and dangerous cargoes. IMCO also publishes *The Medical First Aid Guide for Use in Accidents Involving Dangerous Goods* this is a valuable document covering the field in detail with required treatment within the limits of the 'International Medical Guide for Ships'. It is in the process of being revised and brought up to date.

Understandably, accidents are feared about the possibility of developing oil films following contact with toxic chemicals. It is difficult to ensure that the risk is really reduced and that routine medical examinations with certain exceptions such as such features, are not of value. One can only stress the importance of correct storage, packaging etc. and the importance of the reporting of any accidents with full details followed by medical surveillance of personnel involved for a required period. With this in view the IMCA and the GCRS have devised a personal medical contact card to be given to those involved in an incident or possible accident such personnel will then be monitored for a long as is considered necessary. It is possible that the risk is potentially higher in those ships carrying small consignments of dangerous goods rather than the big ship owners and it is in this case that special care should be taken to ensure that full details of cargoes are clearly made known and where known the medical facilities is placed in the care of the Master Officers attend a course of instruction on the problems of the carriage of dangerous cargoes. Medical lectures are included in the curriculum and it is felt that the question of health risks are at should be discussed.

There is a problem in recording blood

groups in military documents. France is the only Western European nation where the system is uniform to carry a blood group card. It is my view that blood grouping data is not a priority in any patient requiring a blood transfusion will automatically be grouped and cross matched before transfusion. In the event of an urgent immediate transfusion then the patient will be given O negative blood. However, the Red Cross will always group a patient on request and uniformity is given this information and managed to give blood.

The question of noise and vibration in ships is a continuing problem and is especially so in the wake of those associated with health and welfare in the Merchant Navy. The WHA/DA is constantly pressing marine industries to reduce noise in the design stage by proper insulation and avoiding using of machinery in relation to working and living areas. Everybody is aware that high speed machinery must make noise but it is more to maintain the effect of the noise in the design stage rather than attempting to rectify it after the ship is built. Considerable propaganda is used to stress to personnel the importance of wearing protective earplugs when working in conditions above a given decibellimit.

It is of interest to note that only West Germany and Poland undertake routine audiometric examinations and then only for engine room personnel. A few of the larger UK shipping companies undertake audiometric examinations but this only covers a small percentage of the total. The WHA/DA has memoranda on this problem advising that audiometric examinations be introduced for all personnel in the Merchant Navy. Because of fatigue problems these audiometric examinations will be confined at first to engine room personnel, extending to all other branches in due course. It is anticipated that more distress will be a suitable condition for merchant seamen in the near future as it is

in civilian life. It will then be necessary to have a basic test for all new entrants, as compensating may well be needed in cases of noise deafness.

Once or twice a year deaths occur where confined spaces are entered without the wearing of self contained breathing apparatus. Certain categories of workers are trained in its use during firefighting courses and emphasis is placed on the necessity for frequent practice and for wearing the apparatus when there is any question of visibility of air in a confined space.

Two years ago during two short coastal voyages in 1,500 ton ships and a 50,000 ton ship, I found that the SCBA apparatus was being used for practice purposes resulting in them being stored with gas empty cylinders. Representations were made to the DGT and it is now the requirement to carry two pressure cylinders per apparatus carried (Hoping Lloyd of Manchester provides 12 pressure cylinders per apparatus).

At the end of 1979 complaints were being received from passengers aboard in fast container ships on the Tokyo route to Europe via Panama can. They complained of tenderness, headache and lack of concentration which became a nuisance towards the end of the voyage. It was also found that the sleep pattern became disturbed only after leaving Tokyo route but became more pronounced as the days passed and personnel had difficulty in sleeping at night with subsequent discomfort during the day with subsequent irritability etc. These symptoms were also reported by crew as well as by non watch keeping personnel. It should be appreciated that on the 'hard chum' voyage some 15 hours are lost in a voyage of 21,000 miles (around 30 days + 2 day stop).

There are many common factors associated with service in container ships, such as lengthy sea passages, short stays in port (often without the possibility of shore leave), boredom (dread) and professional dis-

as much as there are no old fashioned cargo-handling or storage problems and most of the voyage is in open waters.

As there appears to be no such fatigue problem on the Southampton-Yokohama-Southampton via the Cape or around-bound via Panama it can only be concluded that the last passage making (28 + hours) against the clock must be the prime cause of the fatigue syndrome. Although the condition is rapidly reversible in 1-2 days it has to be remembered that on reaching the European coast these ships have to proceed up the English Channel, a narrow and very crowded waterway. This problem has been noted by most maritime nations operating fast container ships and the problem is kept under constant review. I must confess to being sceptical of this syndrome when I first heard of it but investigation on a short coastal voyage in a ship concerned made it quite clear to me that it was not a figment of the imagination. It should also be pointed out that at the time of the investigation the ship's company had no idea of the reason for my presence on board (other than as a *laissez-passer*) so the investigation was reasonably objective.

Communications

Wireless telegraphy and radio telephony are the standard methods of obtaining medical advice through the international post office radio stations at Portland. This service is supplemented by some radio officer post office coastal radio stations situated around the United Kingdom. Over the past ten years the main source of medical advice has been the Royal Naval Hospital at Plymouth. Vessels armed and operated from the United Kingdom tend to connect with other maritime nations to prefer to communicate directly with their own national systems however the United Kingdom service is being used increasingly by other nations. The maritime medical advice service is so geared to provide advice at Casualty or Senior Registrar level as a

24 hour service. The advice given must be such as to conform with the ship Master's medical guide and the availability of drugs on board ship.

It must be appreciated that not all merchant ships carry the full range of high powered communications equipment nor do they all carry Radio Officers. The Law requires only one radio 1 600 watt and others to carry a Radio Officer, that as the smaller vessels radio communication will be the responsibility of the commanding officer. Very little statistical information is readily available as to the point of use made of the medical section of the international Code of Signals, however information can be obtained from the individual national administrations eg Radio Room (JLR) have issued figures on the number of medical requests received during each year listing such requests country by country. Although not generally published statistics are available for the use made of the medical service for all United Kingdom stations including the international stations at Portland.

Women and Families

A fairly new problem associated with medical aid at sea arose from the increasing number of female seafarers, wives and families aboard ship. Medical staffs have been implemented over the years to include drugs etc for specific female complaints and for children's diseases. In addition it is a usual requirement for all female sailing ships without doctors to produce a certificate stating that they are not pregnant.

Wives and children are allowed to accompany their husbands on certain voyages. The types of voyage allowed are decided by the various companies as are the number of voyages allowed per year. It is my personal view that children at sea should be allowed on coastal voyages only as children are so liable to sudden acute illness requiring hospitalisation. Further children

can get into trouble by clambering about and exploitation ships are not the place for beds and work with a high risk of serious injury. The crew would appear to be confirmed by the high insurance premiums required to cover children at sea. It is of interest to mention that France and Poland do not permit children at sea on any voyage. Italy, Sweden and West Germany have no restrictions: the remaining countries could restrict children to coastal voyages to the coast.

Hospital and Hospital Care

Repopulation for seafarers does present problems. All seamen cases are admitted to National Health Service Hospitals throughout the country but admission of non-urgent cases can be difficult because of long hospital waiting lists. The Dredaught Seamen's Hospital at Greenwich with 150 general beds caters primarily for seafarers but civilians are admitted in circumstances permit. The Dredaught caters largely for mild surgical cases and those for medical investigation.

The existence of this hospital is of great importance in reducing the time that seafarers may have to spend ashore because of non-urgent illness. The Royal Naval Hospital at Portsmouth and Plymouth also accept cases, acute and non-acute, from seafaring ports. Outside the UK local facilities, which vary very considerably, are used by arrangements through local councils or companies agents. An incoast boat to the UK is used to an increasing extent for non-urgent cases. There are smaller hospitals in the Dredaughts at Rotterdam and Hamburg but no other countries would had specialised seafaring hospitals.

Italy has several others situated in Genoa, Trieste and other ports which are

known as Casa Marittima. They look after seafarers and their families from an outpatient angle and arrange hospital admission etc. The case at Genoa is a five storey stone building fully staffed and provided with very modern diagnostic equipment. These outpatient clinics are financed by the shipping companies with small percentage contributions from the seafarers themselves.

The WHO/WHO have set up health centres at Gdynia (Poland) and Stockholm (NO) for the use of seafarers. The Health Centre at Gdynia is similar to but smaller than the Casa Marittima in Genoa but does not appear to cater for seafarers' families. Associated with the centre is the Polish Institute of Marine and Tropical Medicine where research is first held in underseas as it affects seafarers; the Institute is separate from the Polish Navy's Institute of Marine Medicine. Working alongside the WHO/WHO centre are the specialist stress laboratory for control of shipboard loads.

The Mercantile Marine of the United Kingdom has no such Health Centres at present, but it is hoped that a research unit can be integrated into the facilities available at the Dredaught Hospital.

Conclusions

There is nothing new or original in this paper other than possibly the impact syndrome but it is thought that some of the medical problems in the Merchant Navy may be of interest to members of the Royal Naval Medical Service.

Further Reading

1. Medical and Dental Investigations by ITTC/CCMA.
2. *Seafarers Medical Standards, Guidelines and Training*, WHO (Geneva) (1977) 200 pp.
3. *Medical Training, Research and Progress*, Institute of Naval and Medical and Training Research for Merchant Navy (1980) 177 pp. NORAAS.

Unveiling of the New Radiographic Apparatus at HMS Pembroke, Chatham

R. Buckland



From left to right: Mr. James H. G. (Jimmy) Gifford, Director of the Group, standing next to the new apparatus; Mr. Gifford, Director of the Group, standing next to the new apparatus; Mr. Gifford, Director of the Group, standing next to the new apparatus. (The caption is a placeholder for the actual text.)

The history of the Department of Radiology goes back to the early 1940's when HMS Pembroke was designated for the Chatham Division. The Radiology department then was an expensive collection of large glass tubes with cables of bare wire and back-up connections. With the end of the last war the department was moved from K. Blockade, to its present position at Royal Naval Dock Quarter. Many excellent years of service have been obtained from the old General Radiology unit but with space becoming an ever increasing problem change was inevitable. The new apparatus consisted of a GEC RA generator and control panel with an Olympic sliding table for Rayentment examination and tomographic facilities.



To mark this special occasion Rear Admiral C. M. Ryan was the first person to benefit from the test by having his annual routine chest radiograph. A conference to open the new department officially followed in which a toast was made to the project and to a long and fruitful free life.

At HMS Pembroke all but the most sophisticated interests in radiography can be provided the facilities being available to all military establishments in the corner of Kent. This covers the Ministry of Naval Base and ships at Chatham including civilian employees many local Army Barracks with their attached hospitals and the Anti Postal Clinic. In addition a daily courier serves to the Admiralty Medical Board in London and Royal Naval Dockyard in Chatham.

It gives us great pleasure to see the department now looking and functioning along modern lines with many needs of maintenance activity and we look forward to running our full radiographic services again.

LETTERS TO THE EDITOR

Sir

I read with interest the article by Jolly¹ on your Summer issue. Your readers may wish to be reminded of a reference to the earlier naval work on this subject.

I refer to the work of Davidson². Although the full report was awaited, I think that 50 years on it can now be regarded that the report involved, during the Autumn of 1941, HMS/RAF Arkona remaining submerged for 20 days in experimental waters and a few months later during early 1942, HMS/RAF Arkona submerged for a similar period in service waters.

I was a young laboratory technician bound for the trials at the time, and can therefore recall the work involved and supply the reference.

I am, Sir,
C. T. Parsons
Librarian, RNMH, Harlow

¹ JOLLY, E. J. (1971) a patient pressure effects on atrophied oxygen levels in patrol submarines. *J. mar. med. Ass.* 43, 164-166.

² DAVIDSON, W. M. (1949) Physiological problems in coast (and) submarine. *J. mar. med. Ass.* 39, 32-39.

A copy of this paper was sent to Sir Jolly and his reply is printed below.

Sir

I am grateful to Mr Parsons for drawing my attention to the early work of Surgeon Captain Davidson on the physiological problems in coast (and) submarine. The

work had indeed inspired my action. Following Surgeon Captain Davidson's clear indications of the potentially dangerous consequences from scoring hypoxia, it is surprising to find that little has changed in the intervening years despite experiments in submarine and machinery design.

I am, Sir,
E. J. Jolly
Lieutenant Royal Navy

Sir

It has become apparent that there is a wealth of photographic documentary and artefact material relating to the history of the Royal Naval Medical Branch available in our various Hospitals and establishments.

As a result of the stimulus provided by Surgeon Rear Admiral Pugh, and with the approval of the Medical Director General, it has been decided that this material should be collected together with a view to arranging a permanent display of the more interesting and valuable items, and the proper preservation of the remainder.

Because of the gradual contraction of the Branch, the requirement for such a museum has become more urgent and RNMH Harlow has been chosen as a suitable site. I have been invited to initiate the plans for the development of such a project and these are underway.

Inevitably this is a long term scheme and it may well be that assistance with the financial problems involved will have to be

sought from those who are interested in the branch and its part in a later date. At present, that is necessarily a preliminary source of interest.

If any of your readers have in their possession any material which they feel might be of value or interest, I would be delighted to hear from them.

I am, etc.

A. J. Burrell

Surgeon Commander RNY

IN

May I beg the courtesy of your comments to draw attention to a vital problem? Some time ago a meeting began (limited to nine of 'senior appendicists'). The PMSd 4 accompanied him but there was no proper history and the vital signs had not been recorded. Discussion with the patient revealed that the LMA had not actually examined his abdomen at any time. I treated his reflux oesophagitis, interviewed the LMA and was pleasantly surprised that he could give, with a little prompting, the usual history of appendicitis. It was obvious, however, that he had no self-confidence in his ability to deal with an acute medical situation without a medical officer or indeed how he should act in such circumstances. This was his instance when he is here present in the clinic.

Discussion with the PMST was rather stiff and other medical senior rates provided numerous aspects of the grading of the old Back North standard specifications but accepted that for various reasons that had to be. Concern at differences in the quality of basic training was also mentioned. That the problem exists was confirmed by the present. The new Test Book and more

careful selection of personnel for this vital job in Training Division show this etc. Medical Branch is facing the problem but we need rather more.

I would suggest, Sir, that the answer lies with us the officers — medical, dental, nursing and HSE.

We usually claim that we are too busy with our own tasks to stop and teach junior staff all day, but not simply that we are just not interested? If we remember our connection with the staff as to see an interesting physical sign but how much longer it would be to ask them to see an x-ray film or possible suggesting that they were done it up? The benefits of clearing symptoms and signs, manipulating the facts and taking a decision on management will quickly become apparent.

Seniors have considerably interest in the quality of their doc, in most of them only an 'in-quack' when up for Promotion. The Medical Branch needs to show back that it really cares about him by sending only its best time to see to attend to their needs in situations where ships do not have medical officers. From their Lordships point of view as well, the Captain needs a medical adviser who can give him a sensible judgement on a problem of whether or not to divert the ship.

Please doctors, dentists, nursing officers and HSE officers spend a little time each day to increase that MA or ME's confidence in this way so that when the call comes he will be able to use all his resources properly to reach the right decision.

I am, etc.

Richard Kelly

*Surgeon Lieutenant Commander RNY &
RNY*

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general population for a long time, it is generally accepted that there is little or no change in the frequency of specific alleles if the population size is large. However, the population size of the *Salmonella* population is small, and it is not clear that there is only a slight reduction in the frequency of alleles in a small population. It is therefore possible that the frequency of alleles in a small population is not the same as in a large population.

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